CASE REPORTS AND TECHNICAL NOTES

PAIN RESPONSES ON STIMULATION OF THE LUMBAR SYMPATHETIC CHAIN UNDER LOCAL ANESTHESIA

A CASE REPORT*

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The controversy as to whether or not certain pain impulses from the extremities traverse the sympathetic chain on their way to the spinal cord remains unsettled.

Foerster, Leriche, and others are of the opinion that the sympathetic chain contains sensory fibres from the peripheral parts of the body. Livingston, however, has remarked, "Carefully controlled laboratory experiments indicate that all pain impulses from the extremities are carried by fibers which go directly to the spinal cord by way of the posterior roots, without entering the sympathetic chain." J. C. White has come to a similar conclusion and states, "There is no valid evidence that the sympathetic system plays any direct rôles in the central conduction of the painful stimuli."

Abundant evidence collected before and during the past war has demonstrated that sympathectomy will usually relieve the pain of major causalgia. White and others believe that a plausible explanation for this relief of pain in causalgia may be the section of efferent rather than afferent sympathetic fibres as postulated by Doupe et al.

Walker has obtained pain responses on stimulation of sympathetic fibres through buried electrodes. In a series of patients, after performing a preganglionic thoracic sympathectomy according to Smithwick's technique (section of the chain below the 3rd dorsal ganglion and division of the rami to the 2nd and 3rd dorsal ganglia), he placed insulated stimulating electrodes on the distal (peripheral) segment of the divided chain. Subsequent stimulation caused pain in the homolateral upper extremity, the pain response coming on only after a latent interval.

In the present report an experience is described with direct stimulation (electrical and mechanical) of the lumbar sympathetic chain under local anesthesia.

CASE REPORT

History. Jan. 9, 1948. A.R., a white male, 21 years of age, sustained bullet wounds of the right leg in March 1945. A few weeks thereafter a mid-thigh amputation was performed. Phantom limb pain commenced 1 week later when effects of morphine wore off and had been present since. The character of the pain remained the same since its onset. The phantom leg felt as though it were of normal length. The foot felt everted and the toes acutely flexed. There was no sensation of flexion at the ankle but he had the impression that he could move the phantom toes slightly, and this increased the pain in the stump but not in the toes. The pain was usually confined to the foot under the arch and in the toes. At the arch "it feels like someone is sticking a knife into the foot and in the toes it feels as though they are being crushed in a vice." These sensations were constant but the only time the pain was severe was when the patient was lying quietly and not thinking about anything. There was intermittent twitching

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of the stump, which flexed involuntarily. No pain was present in the stump except on tightening the muscles, which caused sharp pain in the stump itself. There was no burning element in the pain.

In 1945 the patient had 1 paravertebral block with novocain which gave complete relief for 1 hour. In February 1948, 3 additional paravertebral sympathetic blocks were performed. The first resulted in complete relief of the crushing pain in the toes and some relief of the stabbing pain in the arch for 15 minutes. This was followed by an aggravation of the phantom limb pain. Approximately 1 hour’s relief of pain followed each of the 2 subsequent blocks. Intravenous sodium pentothal accompanied by suggestion failed to relieve the patient.

In view of the apparent relief from sympathetic block, sympathectomy was advised, although it was explained to the patient that this procedure frequently did not relieve phantom limb pain and no guarantee of a cure could be provided.

Operation. On Feb. 11, 1948, the right lumbar sympathetic chain was exposed under local anesthesia. The skin, subcutaneous tissues and muscles were infiltrated with 1 per cent novocain. Incision from the tip of the 11th rib to the mid point between the umbilicus and the anterior superior iliac spine was made. The approach was then by a muscle-splitting incision through the external and internal oblique and transversalis muscles. The transversalis fascia was broken through by blunt dissection and the peritoneum with its contents reflected medially until the vena cava was exposed. Very gentle dissection was now used along the medial border of the psoas muscle and what proved to be the 3rd lumbar ganglion was brought into view. Retractors were carefully positioned and electrical and mechanical stimulation of the sympathetic chain was now carried out.

Report of anesthetist who recorded the patient’s responses to each stimulation

Patient: A.R.
Complaint: Crushing phantom pain in arch of right foot. Also stabbing pain in arch.
Operation: Right lumbar sympathectomy under local anesthesia.
Procedure: Stimulation of intact sympathetic chain, stimulation of distal (caudad) end of cut chain, and stimulation of proximal (cephalad) end of cut chain.

At the time of stimulation the patient complained of no phantom pain but had a “tingling sensation in arch” and could “feel the big toe.”

1. 2 V. 2 sec. on 3rd (?) ganglion—“electric shock down stump.” The patient cried out.
2. 2 V. 2 sec. on psoas beside ganglion. No effect.
3. 2 V. 2 sec. on ganglion—pain in hip going down stump to arch of foot. “Bad electric shock.”
4. 1 V. 2 sec.—pain similar to #1 and #3, but not so severe.
5. Repeat #4—identical to #4 but electric shock extended into big toe.
6. 1 V. at edge of psoas beside ganglion. No result.
7. 1.5 V. beside ganglion. No effect.
8. 2 V. beside ganglion. No effect.
9. 3 V. beside ganglion. No effect.
10. Tapping on ganglion with blunt instrument—complained of burning pain in stump. “Burning that shot down right into my toes.”
11. Repeat #10—“It burned like hell that time. Right into my big toe.”
12. Silver clip on chain—“It burned like hell right into my toes.” One minute later the patient said, “I still feel some burning in my toes. There was none before.”
13. Silver clip 4 mm. proximal to 1st clip—“Pain like electric shock in right hip.” “Did it go into your foot at all?” “Just a little bit.”
14. Chain cut between the 2 clips—“Pain lasted longer than the rest.”
15. 2 V. 2 sec. over 3rd ganglion in distal stump (caudad)—exactly same pain as when intact chain was stimulated, but very mild.
16. Clip on proximal chain fell off. It had apparently been loosely applied. When the clip was replaced, the patient immediately had severe, lasting pain in stump. “Electric shock and burning.”