a cane to walk in the house. He has walked 7 hours a day outdoors in an attempt to gain strength. He has normal sphincter control. There is no improvement in sexual function. Sensory findings are unchanged. He has nevertheless made considerable improvement.

SUMMARY

A case has been presented in which the upper dorsal spinal cord was transfixed by a knife blade for 19 years before symptoms finally appeared. With the intense reaction in the spinal cord found at operation this patient’s long period of normal activity is indeed surprising.

CONTINUOUS REGIONAL SYMPATHETIC BLOCK; DIRECT CATHETER TECHNIQUE

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Procaine block of the sympathetic nervous system is an integral part of the evaluation and treatment of certain neurovascular disorders of the extremities. Continuous regional physiological suppression of the sympathetic pathways during a controlled period would be of further aid in the management of thrombophlebitis, peripheral vascular occlusion with vasospasm, causalgia, and the sympathetic reflex dystrophies, as well as in the selection of cases favorable for operation.

The advantages of such a technique would be (1) the elimination of frequently repeated injections and (2) the more accurate appraisal of effect when the patient’s suggestibility associated with the routine procedure has been circumvented.

The caudal route has been suggested and used for continuous lumbar sympathetic block. A direct catheter method of producing continuous paravertebral sympathetic block at any indicated level is the subject of this report.

TECHNIQUE

The method requires the use of a special thin-walled blunt needle equipped with a sharp pointed inner obturator and a segment of small-bore vinylite plastic tubing which can be passed readily through the needle (Fig. 1). A No. 18 needle, 9 cm. in length, is suitable. The

![Fig. 1. Obturator and needle with plastic tube inserted.](image)

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shaft and hub of the needle are soldered externally rather than riveted so as to have an uncompromised large bore in order to facilitate free passage of the plastic tubing. The vinylite tubing is 12 to 14 cm. in length and will accommodate the insertion of a No. 23 needle.

Procedure. Paravertebral block is performed in the conventional manner with sterile precautions. For lumbar sympathetic block, the level of the 2nd lumbar ganglion usually is selected. In stellate ganglion block the anterior or posterior approach may be used, the latter being favored by the authors. The needle is inserted in the usual manner to the paravertebral region at the desired site. The obturator is removed and, after preliminary aspiration as a precautionary measure, 10 cc. of 1 per cent procaine hydrochloride are injected slowly. The solution is allowed to diffuse through the tissues for approximately 10 minutes. Success of the block is judged at the end of this period according to the usual criteria. When satisfactory block is achieved, the vinylite tube is passed through the needle to its tip. The needle is removed by withdrawing it slowly with a twisting movement while the tube is kept in its original position with gentle pressure. The tube is fixed to the skin with a fine silk percutaneous suture passed through the procaine skin wheal (Fig. 2). The exposed tubing and injection site are protected with a sterile dressing. It may be necessary to inject two levels in the lumbar region, L2 and L3, in order to obtain full effect, and, in these cases, twin catheters are used. At intervals of 2 to 6 hours as determined by the clinical response, the dressing is removed and 10 cc. of procaine are instilled into the catheter by syringe with a No. 23 needle. The patient’s activity in bed need not be limited.

Sterilization of Equipment. The vinylite plastic tubing (boilable) and needle are sterilized by autoclaving and are included in the regular paravertebral block set.

Complications. It has been found important to anchor the tube to the skin with a suture in order to prevent its movement. In 2 cases where fixation with adhesive tape was relied upon, the tube was prematurely extruded in one instance and drawn into the paravertebral musculature necessitating operative removal in the other. Suture fixation of the tube has proved uniformly effective in all cases. Occlusion of the tube by kinking or by clotted blood has not been a problem and no special measures have been required to maintain its patency. Local infection has not been encountered. Continuous sympathetic block has been maintained for 72 hours with the indwelling catheter. If therapy is desired for a longer period, it is recommended that the tubing be changed and an adjacent segmental level be used.

COMMENT

This procedure has been successfully employed to provide continuous stellate ganglion block in cerebral thrombosis and in post-traumatic sympathetic reflex dystrophy of the upper extremity, and lumbar block in the treatment of thrombophlebitis, varicose ulceration, and intractable pain in the lower extremities. It is believed that the method affords an effective means of attaining continuous regional sympathetic block for both diagnostic and therapeutic purposes.
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REFERENCES

