

The last phalanx dropped off, the ulcer healed up quickly and the local pain disappeared.

*A case of symmetrical gangrene treated by cervical ganglionectomy*

I. B., Mahomedan male, aged 40 years, occupation, cultivator. Admitted into the Campbell Hospital on the 6th January, 1934.

*Chief complaints.*—Pain in the fingers and both forearms; pain in the toes and feet, more marked in the left, but it started in the right side first; callous ulcer on the right index finger, intermediate phalanx being bare and protruding through the middle of the ulcer; the last two phalanges of the left index and ring fingers said to have dropped off, stumps showing irregular scar tissue; an ulcer on the dorsal aspect of the right great toe showing no tendency to heal; and the right little toe was said to have dropped off about 10 months before admission.

*Duration.*—A year and a half.

*On examination* no pulsation of either radial and ulnar arteries could be elicited. Absence of pulsation of right dorsalis pedis and posterior tibial. The right hand and forearm were colder than the left. The right index finger was gangrenous, there was no line of demarcation and the discharge was purulent and very offensive. No thrombo-phlebitis was present. Wassermann reaction, negative. Patient's general condition was good. He was in the habit of smoking 'biris'.

*Blood pressure.*—Systolic, 100 mm. Hg.; diastolic, 70 mm. Hg.

Patient being a male, and pulsation of arteries being absent, the case was thought to be a case of thrombo-angiitis obliterans affecting all the four limbs. This is very rare indeed.

*Treatment.*—Padutin injections were first tried without any results. The patient would not submit to laparotomy, so cervical ganglionectomy operation was performed on the right side on the 5th March, 1934.

*Operation.*—A collar incision was made just above the right clavicle about four inches long. Skin, superficial fascia, platysma and fascia colli were cut. The external jugular vein was ligated in two places and was cut in between. The inferior belly of the omohyoid was found and divided, and the scalenus anterior and the phrenic nerve lying in front of it were exposed. The nerve was retracted medially and the muscle was cut transversely a little above its insertion; thus the second part of the subclavian artery was fully exposed. It was now necessary to ligature and cut the transversus colli artery. Sibson's fascia was separated from the inner border of the first rib

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OBSERVATIONS ON SPINAL NOVOCAINE ANÆSTHESIA

By R. VISWANATHAN, B.A., M.D., M.R.C.P. (Lond.)  
General Hospital, Madras

THE object of this short paper is not to discuss the technique of spinal anæsthesia, but to record untoward symptoms observed during the period the patient is under the influence of

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by the pressure of the index finger and the subclavian vessels and the dome of the pleura were pushed downward. The inferior cervical ganglion was identified lying on the neck of the first rib. The first and the second thoracic ganglia were identified and the sympathetic trunk was cut transversely below the second ganglion. The cut end was reflected upward and the connections of the ganglia with the brachial plexus were cut and the trunk was divided above the stellate ganglion. The soft tissues were placed back in position, the fascia colli was stitched up and the wound was closed without any drainage as there was practically no bleeding.

*Results of the operation.*—Ptosis was marked, the conjunctival vessels were engorged, the tension of the eyeball was less, the palpebral fissure was considerably reduced, and the right pupil was contracted. These physiological effects lasted for about a month. He was seen three months after the operation and the above-mentioned eye changes were almost absent.

Forearm and hand of that side were distinctly warmer. No change in the pulsation of the radial and ulnar arteries was noticed.

There was a marked change in the ulcer of the right index finger. There was a distinct line of demarcation and the necrosed phalanx dropped off. Later on a disarticulation was performed through the metacarpophalangeal joint and the wound healed by first intention.

No weakness of the muscular power was noticed. The patient never complained of pain in that hand and forearm.

As the patient refused laparotomy for lumbar sympathectomy which was considered necessary for the toes, he was discharged on the 4th April, 1934.

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the anæsthetic and also the variations in blood pressure, which have enabled me to draw some conclusions regarding indications and contra-indications for spinal anæsthesia, so far as blood pressure alone is concerned.

Amounts varying from 13 to 16 c.cm. of a 1 per cent solution of novocaine for high and from 1½ to 2 c.cm. of a 7½ per cent solution for low spinal anæsthesia were used.

A small percentage of patients exhibited no untoward symptoms. Some complained of a feeling of oppression in the chest soon after the injection. About 90 per cent of the patients who had no form of pre-operative treatment vomited, some only in the beginning, others throughout the operation. About 50 per cent of them sweated profusely. Other symptoms such as yawning, restlessness, difficulty in breathing, a tendency to stretch the arms, ineffectual attempts to move the anæsthetized portion of the body, hiccough, mental confusion, and intense thirst were observed at times.

With the help of the house-surgeons in charge of the surgical wards, I adopted the following pre-operative treatment in twelve cases, choosing them indiscriminately.

Three doses of a mixture containing 10 minims of tincture of belladonna and a drachm of sodium bicarbonate to an ounce of water were

given beginning from the evening prior to the day of operation. Half an hour before the thecal injection, a ¼ grain of morphia and 1/75 grain of atropine were given hypodermically. Ten out of twelve patients were absolutely quiet throughout the operation. The other two had only slight nausea. I consider that the above form of pre-operative treatment should be effective in all cases of spinal anæsthesia, as most of the untoward symptoms observed are due to sympathetic paralysis and consequent relatively excessive vagotonia. In fact it is the vagotonics who suffer more than the sympathetico-tonics. The latter are really the few people who stand spinal anæsthesia very well without the aid of any form of pre-operative treatment.

Blood pressure readings were taken before and immediately after the spinal injection, and also every five minutes throughout the operation. A half c.cm. of adrenalin was given as a routine in all cases. Although it might have modified the actual variations in blood pressure, it does not materially modify our deductions, as adrenalin was used in all cases.

I am inclined to draw the following tentative conclusions, though they require to be substantiated by further observations.

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Blood pressure in spinal novocaine anæsthesia in all patients

	Age	Diseases	INITIAL BLOOD PRESSURE			AFTER INJECTION AND BEFORE OPERATION			LOWEST RECORDED AND TIME TAKEN TO REACH THIS				AMOUNT OF FALL	
			Systolic	Diastolic	P. P.	Systolic	Diastolic	P. P.	Systolic	Diastolic	P. P.	Minutes	Systolic	Diastolic
1	28	Duodenal ulcer	105	70	35	65	35	30	55	30	25	15	50	40
2	30	"	90	70	20	90	70	20	40	25	15	15	50	45
3	35	"	90	60	30	80	50	30	55	35	20	15	38	25
4	40	"	85	45	40	80	40	40	65	35	30	15	20	10
5	20	"	90	50	40	90	50	40	80	35	45	25	10	15
6	35	"	115	70	45	90	50	40	50	30	20	5	65	40
7	35	"	105	50	55	90	40	50	55	30	28	10	50	20
8	35	"	100	50	50	70	40	30	65	30	35	10	35	20
9	40	"	100	60	40	80	40	40	30	20	10	15	70	40
10	30	"	105	65	40	100	60	40	55	30	25	15	50	35
11	30	"	90	40	50	90	40	50	50	30	20	15	40	10
12	20	"	100	70	30	75	55	20	40	20	20	20	60	50
13	30	"	115	80	35	120	70	50	80	40	40	10	35	40
14	26	"	90	70	20	65	40	25	50	30	20	15	40	40
15	35	"	110	65	45	75	50	25	40	25	15	15	60	40
16	27	"	100	40	60	90	40	50	60	30	30	10	40	10
17	30	"	100	55	45	100	55	45	90	40	50	15	10	15
18	35	"	105	65	40	60	35	25	55	35	20	10	50	30
19	25	Hernia	115	70	45	85	40	45	60	30	30	15	55	40
20	30	"	105	55	50	100	55	45	70	30	40	15	35	25
21	40	"	135	80	55	130	60	70	90	55	35	10	45	25
22	23	"	105	70	35	60	35	25	30	20	10	10	75	50
23	32	Appendicitis	90	45	45	75	30	45	50	20	30	10	40	25
24	25	"	95	50	45	90	50	40	50	25	25	15	45	25
25	36	"	120	55	65	100	50	50	60	30	30	10	60	25
26	30	Sarcoma thigh	115	55	60	100	55	45	45	25	20	55	70	30
27	40	Gastric ulcer	140	110	30	80	40	40	30	20	10	10	110	90
28	35	T. B. cœcum	100	50	50	95	50	45	60	35	25	10	40	15
29	17	Hydrocele	120	65	55	110	45	65	80	40	40	10	40	25



## THE INFLUENCE OF FRESH BILE ON GUINEA-WORM LARVÆ ENCYSTED IN CYCLOPS

(A PRELIMINARY REPORT)

By V. N. MOORTHY, B.S.C., M.B., B.S., D.P.H., D.T.M.  
Guinea-worm Research Officer  
Office of the Director of Health, Bangalore

WHILE conducting a series of infection experiments of *Barbus puckerli* fish with guinea-worm embryos it was noticed that, in specimens of the fish that had died of very heavy infection, the gastro-intestinal tract was invariably flooded with a large quantity of bile. This observation suggested the study of the effect of fresh fish bile on guinea-worm embryos and also on cyclops infected as well as uninfected. It was found that fresh bile of the following species of fish, *Barbus puckerli*, *Barbus punctatus* and *Barbus gelius*, exerts a definite lethal action on cyclops and also on guinea-worm embryos. When undiluted fresh bile was used, it was found that it took about one to two minutes to kill the cyclops and two to three hours to kill the embryos. When its effect on cyclops infected with guinea-worm embryos a fortnight before was observed, it was interesting to note that it had identically the same effect as 0.2 per cent HCl first described by Leiper (1906). It killed the cyclops in the course of one to two minutes and activated the encysted larva. The larva thus activated disorganizes the entire internal structure of the cyclops by its powerful coiling, uncoiling and twisting movements and, in some, it even succeeds in finally escaping out of the body cavity of the

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(1) The fall in blood pressure is great in a patient with high diastolic and low pulse pressure. Hence spinal anaesthesia is contra-indicated in such cases.

(2) Provided the cardio-vascular system is otherwise normal, a systolic pressure even as low as 80 with a diastolic pressure of 45 or over is no contraindication for spinal novocaine anaesthesia. On the other hand I consider such patients better suited for spinal novocaine anaesthesia, as the system is more adapted to low blood pressures.

(3) Diastolic pressure below 40 is a definite contraindication.

(4) The fall in blood pressure is slower and steadier when the initial blood pressure is low.

I have deliberately made these conclusions dogmatic, with the idea of stimulating discussion from anaesthetists, based on their own personal experiences.

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cyclops after about thirty to thirty-five minutes by making an opening through the most vulnerable portion of the cyclops. The position of release seen in the photomicrograph (figure 1)—the junction of the anal segment with



Fig. 1.—Photomicrograph of cyclops infected with guinea-worm embryos 15 days previous to the experiment and treated with the bile of *B. puckerli*. The larva was killed by 30 per cent formalin solution when it was just escaping from the cyclops and then was mounted in two per cent glycerine formalin solution. The larva is seen just escaping through an opening it had made in the cyclops at the junction of the caudal ramus with the anal segment.

the furcal rami of the cyclops—was the most common site through which the guinea-worm embryo escaped. The result was the same when the infected cyclops was treated with fresh goat's bile and sheep's bile, but the time taken to kill the cyclops was nearly thirty to thirty-five minutes and it took on an average sixty-five minutes for the encysted larva to escape. Observations so far made with human bile got by post mortem six hours after death, from a case of suicidal hanging, indicate that it also has an identical effect on infected cyclops; the larva is not, however, activated to the same extent as in the case of fish bile; it takes on an average twenty minutes for the cyclops to be killed and seventy-nine minutes for the encysted larva to escape from the cyclops.

In all the observations made by N. Hamilton Fairley and W. Glen Liston (1924) they have found that, though saliva and pancreatic juice (artificial) had definite lethal action on cyclops,