aspiration bronchitis and pneumonia, possibly due to the mineral oil content alone. Harrison quotes Cameron *et al.* (1939), who investigated the toxicity of lethane 384 in animals. They concluded that the M.L.D. was between 0.025 and 0.2 ml. per kg. of body weight, and that death was probably due to respiratory failure of central nervous origin. Neurological symptoms in our case consisted of drowsiness, irritability for nearly two weeks, together with meningism lasting one day. There was no evidence of damage to the liver or kidneys.

My grateful thanks are due to Dr. F. Pierce Hudson for advice in the treatment and help in preparing this report.

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Endarterectomy for Chronic Endarteritis

Embolectomy for sudden occlusion of an artery has been widely practised, but the possibility of recanalization of a chronically blocked vessel seems to have been studied mainly by dos Santos, in Portugal, and by Leriche, in France. My interest in the possibility of recanalization was stimulated by a lecture given by Leriche in Edinburgh in 1948, and I decided to try the method if a suitable case presented itself. While the case described below was under investigation an account of the operation of endarterectomy appeared in the *Proceedings of the Royal Society of Medicine* of July, 1950, p. 547.

Case Report

On July 16, 1950, Sapper X, aged 40, complained of pain in the right leg on exercise. He dated this from 1944, when he was a prisoner of war in Germany and had been beaten on the back of the thigh with a rifle butt. It had not troubled him greatly until 18 months ago, but since then the distance he could walk without pain had steadily decreased. The right calf was $\frac{1}{2}$ in. (1.25 cm.) less in diameter than the left and the right foot felt colder than its fellow. The posterior tibial, dorsalis pedis, and popliteal pulses were all absent in the right leg but present on the other side. He was therefore admitted for further investigation.

Reflex heating did not appear to raise the temperature or to cause vasodilatation in the affected limb; but this could not be accurately assessed, as no thermo-couple was available. On elevating the legs the right blanched in 1 minute 40 seconds, while the left took 2 minutes 40 seconds. Repeated tests showed that claudication began when he had walked about 200 yards (183 m.). On July 19 an arteriogram showed a localized block of the femoral artery at the lower end of Hunter's canal, with a good view of collateral channels opened up.

I decided to attempt an endarterectomy and, in case I should not find this to be feasible at operation, had some Blakemore tubes made in the dental department so that a vein graft could be substituted. While waiting for the arteriogram wound to heal, and in preparation for operation, the patient was started on an intensive course of physiotherapy, including Buerger's exercises and passive congestion of the limb.

On August 20 he was given 15,000 units of heparin in the morning and 7,500 units six-hourly during the day and night. Next day, to minimize the chances of arterial spasm, Major Burton gave a spinal anaesthetic (1:200 cinchocaine hydrochloride) supplemented by thiopentone and cyclopro-

pane, and a further dose of 15,000 units of heparin was injected. During the operation the coagulation time was more than 30 minutes (control $3\frac{1}{2}$ minutes).

Henry's approach was used and the femoral artery exposed in Hunter's canal. The femoral nerve was deflected medially, and on palpating the artery a non-pulsating segment was found at the lower end of the canal and the pulsations were again felt faintly just proximal to the hiatus in adductor magnus. The artery was gently mobilized and occluded above and below the non-pulsating portion with rubber-covered Doyen's clamps. The arterial wall was incised along its long axis and a yellowish-white fibrous core was exposed. A line of cleavage between this and the media was easily opened up and the core separated from the inside of the artery, using a Watson Cheyne dissector. At either end it was removed by cutting the intima, with which it was continuous, with a razor blade. The distal clamp was opened and free bleeding ensued; it was then closed and the proximal clamp similarly opened for a few seconds. The wound in the artery was then repaired with Thackray's black gossamer silkworm-gut on a No. 6 atraumatic ophthalmic needle. Two layers were inserted, the first taking the whole thickness of the wall and everting the edges, while the second took the adventitia and some areolar tissue only. Both sutures were continuous. The distal clamp was then removed, followed by the proximal, and the suture line was found to leak at two points; these were sealed with mattress stitches. Throughout the time the artery was open the wound was perfused at regular intervals with saline containing heparin. The canal and wound were then closed, a corrugated rubber drain being left down to the canal for 24 hours. The patient was kept heparinized for five days.

On the fifth day the posterior tibial pulse was palpable at the ankle and has remained there since. Post-operative Buerger's exercises and exercises to develop the leg muscles were started on the fifth day; the patient was allowed out of bed on the tenth, and started walking on the fourteenth day. One month after operation the posterior tibial pulse was easily felt, the right foot felt warmer than the left, and he could walk over 2,000 yards (1,830 m.) without the slightest suggestion of a claudication pain.

Major Currie, who examined the core, reports: "The specimen [see illustration] consists of the intima of the artery and an organized thrombus in which there is evidence of recanalization. The thrombus is composed largely of hyaline fibrous tissue in which there is much calcification. At one point there is separation of the layers of the intima by hyaline fibrous tissue which is almost certainly the end-result of haemorrhage into the wall of the vessel. The staining reactions of this tissue with haematoxylin and eosin and van Gieson are identical with those of the non-calcified portion of the intravascular thrombus. The intima itself shows some eccentric fibrous thickening, and there are a few small focal areas of round-cell infiltration. These cells are mainly lymphocytic in type, and the appearances do not suggest that the lesion is essentially of an inflammatory nature."

Although it is too early to claim a permanent cure in this case I feel that the results of the operation are most encouraging and that the method is worthy of further trial.

I have to thank Colonel Coutts, D.D.M.S., B.T.A., for permission to publish this case.

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