two were apparently undetected ambulatory cases and were able to develop a chronic carrier state. Despite the variety of medical and surgical procedures that have been advocated to rid the individual of his carrier condition, and despite the introduction of chloramphenicol, it would appear that the treatment of the carrier state in typhoid fever still has to be solved.

We have to thank Dr. J. S. McGregor, the medical superintendent, for permission to publish this paper. We would also like to express our thanks to the nursing staff concerned.

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REFERENCE

Rumball, C. A., and Moore, L. G. (1949). *British Medical Journal*, 1, 615.

A Case of Pethidine Sensitivity

The following case is of interest in view of the introduction of intravenous pethidine as an anaesthetic agent to supplement nitrous oxide and oxygen (Mushin and Rendell-Baker, 1949).

CASE REPORT

The patient, a woman aged 26, weighed 7 st. 6 lb. (47.2 kg.), and her pre-operative blood pressure was 130/86 mm. Hg. Apart from a history and findings indicating a gastric ulcer, for which vagotomy was to be performed, she was in good health. There was no history of previous illness.

Premedication with morphine 1/6 gr. (11 mg.) and atropine, 1/100 gr. (0.65 mg.), was given subcutaneously, and one hour later a test dose of gallamine triethiodide ("flaxedil"), 20 mg., was given intravenously into the left arm; after three minutes she complained of tiredness and diplopia. As respiratory difficulty did not occur a further 60 mg. was given, followed immediately by 0.5 g. of thiopentone. The lungs were inflated several times with oxygen, and a size 9 cuffed endotracheal tube lubricated with "nupercainal" was passed by direct laryngoscopy without any difficulty. The tube was connected to a Waters assembly, the cuff was inflated, and a mixture of 1 litre of oxygen with 2 litres of nitrous oxide was given; in a few seconds the patient took a breath, and soon began to breathe regularly.

Just before the operation started 25 mg. of pethidine was given intravenously into the right arm and the syringe strapped on. The patient became apnoeic within 45 seconds, and was inflated rhythmically with a nitrous-oxide-oxygen mixture, the bag being emptied to the air and refilled with fresh gases every minute or so. When the abdominal incision was made it was noticed that there was very little bleeding, and the temporal pulse, which was 140 a minute, was of poor volume and soon could not be felt at all. No blood-pressure reading could be obtained either by palpation or by auscultation, so the patient was put in a head-down tilt. It was reassuring that she kept a good colour, and as the capillary refill time was only very slightly retarded no other measures were taken.

The operation was continued under what the surgeon later described as perfect operating conditions, and a chronic, active, and grossly scarred ulcer was found in the first part of the duodenum. A pyloroplasty was performed, and towards the end of this stage of the operation, about 20 minutes after the pethidine had been given, a systolic pressure of 70 mm. Hg was recorded. The right and left vagus nerves were then identified and divided, the systolic pressure rising to 80 mm. Hg and the pulse rate remaining steady at 120 a minute throughout this time.

When the peritoneum was closed the Waters canister was removed and the lungs inflated five or six times with pure oxygen to determine the depth of anaesthesia; within a few seconds the patient took a deep breath, moved her arms, and wrinkled her forehead, so the flow of nitrous oxide was resumed and the soda-lime replaced. She continued to breathe, and settled down in a few seconds; the skin incision, which had been dry, began to bleed briskly, the systolic pressure having risen to 100 mm. Hg. When the pethidine syringe was removed from the arm a skin weal was found running proximally for about 4 in. (10 cm.); it was exactly superficial to the course of the vein, and remained for a further two hours before gradually disappearing.

At the end of the operation tracheo-bronchial toilet was performed and the endotracheal tube removed; after breathing pure oxygen for less than two minutes the patient regained full consciousness, answered questions intelligently, and complained of headache. She was returned to bed and kept head-down for six hours, but no further ill effects were seen. The duration of anaesthesia was one and a half hours.

Apart from slight abdominal discomfort on the following day, recovery was uneventful; the patient was up on the third day, and went home 12 days after operation.

As no account of a similar occurrence could be found in the literature, an attempt was made to investigate it, and to desensitize the patient. An intradermal injection of 0.1 ml. of pethidine solution (100 mg. in 2 ml.) produced in the patient a skin weal 2 cm. in diameter, there being no response to a control of normal saline. Controls in normal volunteers showed that pethidine in itself produces a weal in all cases, though it has been stated that pethidine antagonizes histamine (Gruber *et al.*, 1941). It has also been learned that a subcutaneous weal running along the vein is not an unusual finding, though not previously described, when repeated doses of pethidine are given through an indwelling intravenous needle. In one considerable series of cases it was present quite often and in itself is apparently of no significance (L. J. Wolfson—personal communication).

Further injections of 0.2, 0.3, and 0.5 ml. of pethidine solution, containing 10, 15, and 25 mg. of pethidine respectively, were given subcutaneously at hourly intervals, with the hope of desensitizing the patient. One week later a slow intravenous injection of 50 mg. of pethidine was given and blood-pressure readings were taken; apart from slight drowsiness, which persisted for an hour or two, no effects were apparent.

Although hypotension, respiratory depression, and bradypnoea have been noted with larger doses of pethidine, both in animals (Gruber *et al.*, 1941) and in my own clinical experience, no case of this severity has yet been reported in which the blood pressure was unrecordable for 20 minutes, and in which apnoea—probably prolonged by acapnoea in the later stages—and perfect anaesthesia lasted for one and a half hours after the relatively small dose of 25 mg. It seems advisable to give a preliminary test dose of 10 mg. of pethidine intravenously when this method of anaesthesia is to be used.

I am indebted to Mr. H. Daintree Johnson for permission to report this case, to Dr. H. Woodfield-Davies and Dr. J. A. Smith, of the Postgraduate Medical School of London, for their interest and advice, and to Dr. L. J. Wolfson, senior consultant anaesthetist to the Birmingham Accident Hospital, for making available his clinical findings.

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REFERENCES

- Gruber, C. M., Hart, E. R., and Gruber, C. M., jun. (1941). *J. Pharmacol.*, 73, 319.
Mushin, W. W., and Rendell-Baker, L. (1949). *British Medical Journal*, 2, 472.