

## THE CONTROL OF NAUSEA AND VOMITING IN SPINAL ANÆSTHESIA.

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THE object of this paper is to present three small but selective series of spinal anæsthetics demonstrating one way of controlling the nausea and vomiting which, however slight, often occurs during and after spinal anæsthesia.

Briefly the causes of nausea and vomiting under spinal techniques are the fall in blood-pressure following induction, traction on the mesentery and viscera but in particular the meso-appendix, the presence of bile in the stomach, psychic effects, the idiosyncrasy to pre-operative morphine and the effects of the anæsthetic *per se* (Maxson 1938). The final common path of all of these causes is along the parasympathetic supply to the stomach and gut. This path cannot be blocked by a "spinal" injection.

How then can nausea and vomiting be controlled?

A regional block of the parasympathetic supply to the stomach can be established by injection around the nerves near the lower part of the œsophagus. This will control these ill-effects but there is a danger of including the terminal branches of the phrenic nerves with consequent diaphragmatic paralysis; moreover, only sometimes is the œsophagus within reach of the surgeon.

Recently Anderson and Morris have shown that, contrary to the usual opinion, small doses of atropine (i.e. 1/100 gr.) produce an increase in the contractions of the human stomach while a larger dose (i.e. 1/50 gr.) will produce a long cessation of gastric contractions. Therefore, theoretically, a large dose of atropine should control vomiting. The vomiting can also be controlled by rendering the patient unconscious by giving a light general anæsthetic in conjunction with the spinal; in particular cyclopropane, nitrous oxide or pentothal. In 100 cases of epigastric, incisional and inguinal herniæ, performed on healthy adult males, the incidence of nausea or vomiting was 10 per cent. The anæsthetics used were 5 per cent stovaine and 1 : 1,500 nupercaine. Nearly every case which vomited had been anæsthetised with stovaine.

In the above series nearly all of the factors which cause nausea or vomiting were present to a greater or lesser degree except traction on the mesentery. I believe that the vomiting and nausea when it occurred was due to the anæsthetic *per se*, in this case nearly always stovaine, or to the psychic trauma involved.

However, in a series of fifty appendicectomies performed on healthy adult males between the ages of 18-45, premedicated with alopon and scopolamine one hour before operation and anæsthesia induced with an average dose of 12 c.c. of 1 : 1,500 nupercaine, the incidence of nausea or vomiting was 40 per cent which seemed extraordinarily high when the available literature was consulted.

A second series of fifty consecutive appendicectomies was embarked upon, using the identical technique of the first series, but oxygen and carbon dioxide was administered from the beginning of the operation until the peritoneum had been closed. In this series the total number complaining of nausea or having vomited was nine, i.e. 18 per cent. As opposed to the first series the vomiting often occurred at the end, or after, operation rather than during it.

In local and regional anæsthesia if there is sufficient sedation there is much less shock, much less circulatory disturbance and hardly any nausea (Bourne, 1942). With the above statement in mind it was determined to note the incidence of nausea or vomiting in a third series of fifty consecutive appendicectomies using a similar technique to the first but, following on the induction of the spinal block, an intravenous injection of morphine was given according to the following technique:  $\frac{1}{4}$  gr. of morphine dissolved in 2 c.c. of normal saline given slowly intravenously over a period of two minutes. If the pupils contracted down quickly during injection only  $\frac{1}{8}$  gr. was given. Some cases were given alopon  $\frac{1}{8}$  gr. in lieu of the morphine.

The above procedure has been used over long periods with safety. Moreover, the morphine disappears from the circulation within one hour. This series showed no increase in post-operative chest complications. The technique has been used in major thoracic surgery with success.

It was particularly noticed that the patients in this series were quiet, restful and warm. No case gave any cause for anxiety. No case vomited at operation, two felt nauseated, one of them vomiting five hours after completion of operation; incidence was expressed as 4 per cent.

## SUMMARY.

- (1) Vomiting and nausea is commoner than is supposed under spinal anaesthesia especially with traction on the meso-appendix.
- (2) The use of continuous oxygen and carbon dioxide will prevent these effects in some cases.
- (3) Medication with intravenous morphine will prevent these effects in the great majority of cases.

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## THE THERAPEUTIC USE OF VITAMIN C.

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## SUMMARY.

OBSERVATIONS made upon two sections of R.A.M.C. men dosed with vitamin C gave differences far beyond those that could be attributed to chance. It was ascertained that men of one section were dosed before breakfast, those of the other after it. The latter became saturated and excreted excess vitamin sooner than the former.

In the winter 1941-42 and late spring 1942 an investigation planned by the Hygiene Directorate of the R.A.M.C. to ascertain the vitamin C reserves of troops was carried out by one of us. The method used was that of Harris and Abbasy in which men are dosed with vitamin tablets till an analysis of the urine indicates an approach to saturation; this may take from a few days up to ten or twelve in scorbutic cases. At each station a hundred men were tested; in one instance half were infantry and half R.A.M.C. personnel of a military hospital. The latter were in equal sections, A and B, and it happened to be convenient to dose section A, the infantry and section B in that order starting at 07.30 hrs. Section B went on with their hospital work till required for dosing, at about 08.00 hrs. There were most unexpected differences between the two R.A.M.C. sections. The men shared the same Me.s and had miscellaneous hospital work. They were sections only for A.R.P. and similar duties. Accordingly very different behaviour in these sections appeared to be a severe blow to one's confidence in the method. The results were as follows. Four doses were given; men near saturation after four doses were listed as saturated after five. Five (a) in the table denotes men showing such an increase in excretion as to appear likely to be