I consider that the intravenous method requires some experience and technical skill, and that the patients receiving such injections should be under close institutional supervision.

As is well known, no fixed rule can be used for calculating the dosage, and individual variations exist in man. This one point alone is sufficient to contraindicate the use of barbituric acid derivatives in large doses. It is considered, however, that doses of 3 to 9 grains (0.2 to 0.6 gram), not exceeding 15 grains (1 gram), are comparatively safe limits for sodium amytal. It is seldom necessary to use more than $7\frac{1}{2}$ to 9 grains (0.5 to 0.6 gram).

In the field of anaesthesia there is ample evidence that sodium amytal is useful primarily as a hypnotic for the pre-anaesthetic preparation of the patient, and not as an anaesthetic agent. In the field of medicine it is useful for the control of convulsions, unmanageable mental cases, and as a specific for strychnine poisoning.

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A COMPARISON OF SODIUM AMYTAL AND PERNOCTON AS PRE-ANAESTHETIC HYPNOTICS.*

BY

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THE properties and use of sodium amytal are becoming so familiar through the work of Zervas, McCallum, Kast, Lundy, and others, that more than a brief recapitulation of its advantages and drawbacks is unnecessary. This drug, when given intravenously in full doses, will, in many cases, produce complete anaesthesia without the use of any other agent; and, when the normal doses are not exceeded, is apparently without harmful effect. When the drug has to be supplemented by other local or general anaesthetic agents a much smaller quantity than usual will produce satisfactory anaesthesia. Higher doses cause a considerable fall in blood pressure, as much as 50 per cent. in some cases, though the average is 25 per cent.

Pernocton is the sodium salt of secondary beta-bromallyl-barbituric acid. Its pharmacological action and clinical effects resemble very closely those of sodium amytal, with several important exceptions.

A number of cases in which hypnotic doses of sodium amytal were given were analysed. Dosages varying from 5 to 12 grains and averaging 9 grains, caused an initial fall in systolic blood pressure, which ranged from 10 to 40 per cent.; the average fall was 14 per cent. Not one of our cases in which pernocton was given showed a fall in blood pressure. As the doses were limited to produce only hypnosis all our pernocton cases were included in this series. Falls in blood pressure of 5 per cent. or less were disregarded as being within the range of error in making the determination.

The hypnotic effect of pernocton seemed to be more powerful than that of sodium amytal, the average dose of which required to produce unconsciousness was 9 grains. The average dose of pernocton used to produce the same

effect was $4\frac{1}{2}$ grains. It would seem, therefore, that this drug has about twice the hypnotic action of sodium amytal.

The recovery phase comprised three fairly definite intervals. The complete unconsciousness following a hypnotic dose of pernocton closely resembled natural sleep, and varied in length up to seven hours with an average duration of two hours. From this stage the patient gradually drifted into semiconsciousness, although nearly half were already in this condition, immediately upon leaving the operating table. They could be roused to answer questions, or to take fluids, nourishment, and medicine, but would soon lapse into sleep again when left alone. Perception of all external stimuli was dulled, and with the attainment of complete recovery there was usually no recollection of events that had taken place previously. Restlessness during this period occurred only in 3 per cent. of patients, and was easily controlled by small doses of morphine. This affords a very marked contrast to patients who had received sodium amytal, half of whom showed more or less restlessness, and several required forcible restraint. While it is true that the post-operative excitement seen during recovery from sodium amytal can usually be controlled satisfactorily by the prompt administration of morphine, it requires special nursing and constant vigilance during the whole recovery period.

This period merged gradually into a third stage of recovery, in which the patient had full perception and was quite conscious, but felt somewhat drowsy and "dopey." The administration of morphine and other sedative drugs will modify and prolong these stages of returning consciousness. In general, the recovery period was of half the length, and was characterized by much less restlessness than is associated with sodium amytal.

Two patients in our series vomited considerably, one immediately after the injection and one post-operatively. Though other factors might have been responsible, it was felt that pernocton played some part in this post-anaesthetic sickness, and we attributed it to undue haste in making the intravenous injection. These were among our first cases; since then we have had over one hundred additional cases, none of whom vomited or showed any tendency to nausea. No vomiting followed the use of sodium amytal, and no respiratory depression or pulmonary oedema was seen.

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Dosage and Administration.

Pernocton is administered intravenously in 10 per cent. solution. It is put up in ampoules containing 2.2 c.cm. ($3\frac{1}{2}$ grains) of the solution, and is ready for injection without any dilution, mixing, dissolving, or other manipulation. As the average hypnotic dose is only $4\frac{1}{2}$ grains it can be seen that the volume of the usual injection will be about 3 c.cm. It is given at the rate of 1 c.cm. per minute, and this smaller volume results in a saving of time, and cuts short a rather tedious procedure.

The pH of the solution is 9.8, as is that of sodium amytal; the injection must be given slowly to prevent concentration, and to allow dilution and absorption in the blood stream. The dosage as recommended by Bumm averages 1 c.cm. for every 30 lb. of weight, with a total average of 4 to 5 c.cm.; this dosage presumes that no other anaesthetic is being administered. Since the majority of our patients received morphine in some form also, we were able to obtain the same satisfactory results with smaller doses of pernocton.

As in the case of sodium amytal, many fractures could be painlessly reduced with the help of pernocton, and other minor procedures be carried out without the aid of any other anaesthetic. The use of pernocton in obstetrics will be reported upon subsequently, since we have not yet sufficient cases to draw definite conclusions in this respect.

Summary and Conclusions.

Pernocton (sodium secondary-butyl beta-bromallyl-barbituric acid) is a synthetic barbiturate resembling sodium amytal in its composition and action. It has all the advantages of sodium amytal as a hypnotic, and in addition there is: (1) almost complete absence of restlessness and excitement during the recovery period; (2) no fall in the blood pressure; (3) a more powerful hypnotic effect; (4) a solution prepared ready for injection; (5) a smaller volume to be injected; (6) a shorter period of unconsciousness; and (7) better and earlier co-operation during the recovery phase.

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INTRAPERITONEAL GESTATION WITH RECTAL HAEMORRHAGE.

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ALTHOUGH extrauterine gestation is, unfortunately, a not exceedingly uncommon accident, cases are rare of such a conception persisting more than a few weeks. Death of the ovum with its expulsion as a tubal mole, or rupture with its attendant train of acute phenomena, usually terminates the pregnancy; or possibly pain, and maybe unexpected irregular vaginal loss, arouse the patient's suspicions that all is not proceeding as it should. For women are learning to-day that the normal pregnancy should follow certain definite lines, and that any gross departure therefrom should call for a medical examination.

An ectopic gestation persisting for any length of time is bound to cause considerable disturbance in that portion of the abdomen or pelvis within which it is situated. How disastrous these disturbances may be is illustrated by the following case.

A multipara, aged 27, who had had three previous normal pregnancies, was admitted to Hackney Hospital on January 26th, 1928, stating that she was six months pregnant, was suffering from severe pain in the lower abdomen, and had that day commenced bleeding per vaginam. Her last regular monthly period had been six months previously, and, though she was certain that she was pregnant, her pregnancy had by no means

followed a normal course. On careful questioning it transpired that her amenorrhoea had not been complete. She had had several small attacks of bleeding, and a more or less continuous yellowish vaginal discharge. All the time she had suffered from malaise, and from an almost constant lower abdominal pain and backache. This pain had had several exacerbations, which necessitated her lying up from time to time, but until three days before admission she had not had any really acute attack of pain. Her acute history dated from January 23rd, when she was seized with a violent pain in the left iliac fossa, and felt very ill; she was admitted to hospital three days later with a temperature of 101.2° F., a pulse rate of 140, and passing clots per vaginam.

On examination she looked ill, and was very pale. The breasts were active. All the lower part of the abdomen was held rigidly, and was very tender on palpation, especially in the left iliac fossa. Rising from the pelvis was a tumour, reaching almost to the umbilicus, and extending over towards the left side of the abdomen. It was non-fluctuant and dull to percussion. A souffle was audible about one and a half inches below the umbilicus, but not over the position of the uterine arteries. On admission the uterus was not felt apart from the tumour, but when the muscles were relaxed under anaesthesia this physical sign, as will be seen later, proved to have been erroneous. The tumour was not felt to contract under the examining hand. Foetal heart sounds were not heard, nor were movements detected. On vaginal examination clots of blood and a vaginal discharge were found to be present; there was tenderness in the anterior fornix, and the os uteri admitted a finger-tip. Bimanually, movements were not transmitted from the swelling to the cervix.

The following day an anaesthetic was administered, primarily with a view to a more thorough examination. As the patient was being placed in the lithotomy position before the vaginal examination she passed 20 oz. or more of bright blood per rectum. A rectal examination revealed nothing to account for this. With the abdominal muscles well relaxed the uterus was now felt as a separate entity, lying well to the right side, and enlarged to about twice its normal size. A uterine sound confirmed this. In view of the copious rectal haemorrhage an immediate laparotomy was performed.

Adherent to the abdominal wall below the level of the umbilicus, and above the left broad ligament, was a sac, which when opened proved to contain a very offensive fluid mass of faeces, blood, and liquor amni, together with a partially macerated foetus, the whole showing evident signs of infection. The foetus measured 17 cm. from vertex to buttocks and was well formed. The placenta was seen in the left lower aspect of the sac. Severe haemorrhage from large vessels which lay around the placental site and in the wall of the sac negated any intervention beyond rapid removal of the foetus, marsupialization of the sac, and firm packing. A blood transfusion of 400 c.cm. was given that evening. There was little further bleeding from the very offensive wound in the abdomen, but there was extensive bleeding per rectum, and the patient died on the following evening.

A post-mortem examination was performed. Most of the lower abdomen was found to be occupied with a sac, situated in the abdominal cavity above the left broad ligament, formed by omentum, transverse and descending colon, caecum, and the anterior abdominal wall. The placenta was adherent to the abdominal wall in the region of the left iliac fossa and to the descending colon. It measured about three inches in diameter. The left tube and ovary could not be identified. A perforation which admitted a finger connected the sac with the descending colon, and the whole colon and caecum were distended with blood. No other perforation existed. In spite of the fact that at the operation the general abdominal cavity was opened, there was no evidence of peritonitis in the upper abdomen.

Certain features in this case appear to call for special comment. Communication of the sac of an ectopic gestation with the bowel, particularly the rectum, has been recorded previously. The remarkable fact seems to be, not that such perforation did occur, but that, the sac being situated in the position in which it was, this rupture did not occur earlier. Cairns Forsyth¹ and Schwartz² record cases of perforation of an ectopic gestation into the rectum, and in both cases the age of the foetus was about six weeks. It is also interesting to note that in both these cases the symptom which most imperatively called for surgical intervention was rectal haemorrhage. Schwartz in the description of his case, in fact, remarks: "Dans tous les cas, c'est l'existence d'une abondante et subite haemorrhage rectale qui a commandé l'intervention."

Needless to say, except for the close proximity of the rectum and descending colon on the one side, and the caecum on the other, there is no reason why the bowel should be involved more than any other viscus. The