same type of apparatus is employed in conditions where a helium-oxygen mixture may be desired, as in the treatment of asthma. . . .

"Except for the possible effect that carbon dioxide may have upon the oxygen dissociation curve for hemoglobin, this gas has very little place in the treatment of the hypoxic states. . . . Oxygen therapy equipment, at best, may be either confining or irritating such as the pressure of a mask upon the face, or by the presence of a catheter in the oropharynx. Some patients will tolerate some of the methods better than others. . . . The greater the care the apparatus requires the more likely is it that satisfactory percentages will not be maintained and thus the therapy is apt to be unsuccessful."

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LUNDY, J. S., AND TUOHY, E. B.: *Newer Trends in Intravenous Anesthesia.* Minnesota Med. 26: 349–350 (Apr.) 1943.

"The original technique of giving large doses of the anesthetic agent and withdrawing the needle has been abandoned in favor of intermittent injections of doses that are safe but sufficient. The principle of this technique of injection is not fundamentally different from that of the administration of ether by the open drop method. With both procedures the anesthetic agent is given if, and when, and in whatever quantity it is needed. The use of a 5 or 10 per cent solution of the anesthetic agent has been abandoned and at present a 2.5 per cent solution is used so that the untoward results from extravenous injections are no longer seen. . . . Use of intravenous anesthesia as a part of balanced anesthesia has been the latest trend in the use of the method. Preliminary medication is essential to the optimal application of intravenous anesthesia. . . . Local, regional or spinal anesthesia is employed together with intravenous anesthesia with pentothal sodium at the same time that a mixture of 50 per cent nitrous oxide and 50 per cent oxygen is administered by inhalation. This form of balanced anesthesia has certain demonstrable advantages. . . . The administration of a local anesthetic agent can be carried out either before or after the induction of anesthesia by the intravenous administration of pentothal sodium. The convulsant effect of an overdose of the local anesthetic agent is largely counteracted by the preoperative administration of a barbiturate and the intravenous administration of pentothal sodium. Pain of injection of the local anesthetic agent is neutralized by the analgesic effect of morphine plus the anesthetic effect of pentothal sodium. The preoperative administration of atropine results, among other things, in drying secretions and little or no accumulation of foreign material in the oropharynx. It also tends to prevent laryngospasm which may develop readily because pentothal sodium is a thiobarbiturate and seems to increase the activity of the throat reflexes. In cases in which intravenous anesthesia is to be used for manipulation within the throat, a local surface anesthetic agent, such as cocaine, must be applied just as should be done if the manipulation, bronchoscopy for example, were to be done with the patient under local anesthesia only. Because in deep surgical anesthesia with pentothal sodium respiration is depressed markedly, at first it was found necessary to give oxygen also. Later it was found that a combination of 50 per cent nitrous oxide and 50 per cent oxygen was just as effective in supplying the patient with oxygen and definitely decreased the amount of pentothal sodium that was necessary.

"A point of special value to remember when pentothal sodium is to be ad-

ministered with a spinal anesthetic agent is that the spinal anesthetic agent produces intercostal paralysis, the pentothal sodium central paralysis and the result is extraordinarily quiet respiration. The administration of a combination of oxygen and nitrous oxide, half and half, reduces the dose of pentothal sodium enough so that respiration remains adequate. When this combination of pentothal sodium given intravenously and a mixture of half nitrous oxide and half oxygen by inhalation is used, it is important that these general anesthetic agents are not administered for at least fifteen or twenty minutes after the spinal anesthetic agent has been administered and that determinations of blood pressure are made at frequent intervals while this type of anesthesia is maintained. Because of the relative suddenness with which an untoward result may develop, pentothal sodium is seldom used for the preoperative prediction of the probable result of sympathectomy on hypertensive patients. The use of divided doses of sodium amytal by mouth can give practically the same information although the test requires a longer period of time with sodium amytal than with pentothal sodium. However, pentothal sodium given intravenously in small doses (7 to 10 cc. of a 2.5 per cent solution) before inhalation anesthetic agents are administered has proved advantageous for hypertensive patients. There is little change, however, in the contraindications to the use of pentothal sodium: it should not be used for children less than ten years of age unless they are large and 50 per cent oxygen and 50 per cent nitrous oxide is administered simultaneously, for patients who have cardiac disease and decompensation, nor for patients in marked shock especially when it is due to marked loss of blood.

"The use of pentothal sodium in doses sufficient only to produce light surgical anesthesia for such operations as extraction of teeth has been described by Hubbell and in time may be used widely. Barbiturates given intravenously have not produced satisfactory anesthesia for normal deliveries but have been satisfactory for cesarean section when given in association with local anesthetic agents. . . . The use of pentothal sodium instead of ether as an auxiliary agent to reinforce anesthesia with nitrous oxide and oxygen permits a technique which is fireproof."

J. C. M. C.

HELLMAN, L. M.; SHETTLES, L. B., AND STRAND, HERBERT: *A Quantitative Method for the Determinations of Sodium Pentothal in Blood.* J. Biol. Chem. 148: 293–297 (May) 1943.

"The known methods for the analysis of barbiturates in blood, in which the Koppanyi colorimetric reaction is employed, have not proved generally satisfactory for the quantitative determination of the thiobarbiturates. . . . In the process of conducting a series of studies on the transmission through the human placenta of one barbiturate, sodium ethyl (1-methylbutyl) thiobarbiturate (sodium pentothal), it therefore became necessary to discover a method which obviated the errors in the known methods of analysis. With the ultraviolet absorption technique it was found that pentothal acid in ether demonstrated a maximum absorption at 2880 Å. With a quartz monochromator set for 2880 to 2900 Å., with inlet and exit slits at 0.5 mm., it was possible to obtain numerical values for varying concentrations of pentothal, these being read by means of an ultraviolet-sensitive cell and galvanometer. . . . Extractions were carried out on whole blood as follows: 25 to 30 cc. of venous blood were decalcified with 0.4 gm. of sodium citrate. Of this, 20 cc. were put in a