

both of these incomplete anesthesia was present."

J. C. M. C.

Mock, H. E., Jr.: *Refrigeration Anesthesia in Skin Grafting*. J. A. M. A. 122: 597-598 (June 26) 1943.

"Refrigeration anesthesia for skin grafting opens a new field for the use of reduced temperatures in surgery. In 27 cases requiring small or multiple small split thickness skin grafts this method was used. . . . Two hours before operation, one or more uncovered ice bags are applied directly to the area from which the skin is to be taken. The number of ice bags required depends entirely on the amount of skin to be anesthetized. Slight pressure deepens the anesthesia, so it has been our practice to tie or bandage the ice bags in place. . . . The maximum anesthetic effect lasts approximately twenty minutes after the ice bags have been removed. . . . During the course of rounds the procedure is done at the bedside or in the dressing room. . . . preoperative medication is not usually necessary but may be a helpful adjuvant. . . . Complete anesthesia was obtained in 24 of the 27 patients prepared by refrigeration. The 3 patients with incomplete anesthesia complained of a burning sensation when the graft was cut, but it was not sufficiently acute to necessitate another form of anesthesia. In each of these cases we were too hasty and did not allow a full two hours for chilling. Refrigeration does not noticeably affect the growth of the graft or the repair of the donor site." 3 references.

J. C. M. C.

NIXON, E. A.: *Amputation Anesthesia by Freezing*. Northwest. Med. 42: 131-133 (May) 1943.

"I have used freezing anesthesia in five thigh amputations for gangrene. These patients were poor risks, includ-

ing one case of Buerger's disease, three arteriosclerosis and one of diabetes. . . . The patient should be assured of a good sleep the night before surgery. The following morning nembutal, grains 1.5, is given one hour before applying the ice. A small dose of morphine or an H.M.C. No. 2 thirty minutes before icing is of definite value in getting better cooperation from the patient. . . . After sedation, several ice bags or collars are applied to the leg at or slightly above the proposed level of the tourniquet. The tissues are numb and application of the tourniquet is not painful. . . . I believe that a pneumatic tourniquet with a gauge is indispensable. From eight to twelve pounds of pressure is required for amputation through the thigh or leg. . . . The tourniquet must be placed at such a level as to permit freedom in handling the extremity and adequate space for surgical cleansing and draping. . . . A rubber sheet is placed under the extremity and the entire surface of the leg and thigh covered with about a two-inch thickness of ice. . . . A skin temperature of about 5° C. is optimum and does not result in actual freezing of the tissues. The time required varies somewhat, being about two and a half hours for a low or mid-thigh amputation, two hours for the upper third of the leg, and one and a half hours for the toes or a metatarsal amputation. . . .

"The patient is removed to the operating room with the extremity encased in ice. . . . The solutions and instruments should be cooled by immersing the basins in ice baths. Skin preparation and draping should be completed rapidly. . . . Baneroft, Fuller and Ruggiero have suggested a modification of the Callender operation with particular reference toward preserving the collateral superficial blood supply about the knee, and the production of a well padded stump adaptable to an artificial leg. . . .

Where refrigeration is employed it is unnecessary to place a tape about the vessels, as a tourniquet controls the bleeding. A hand saw may be more convenient than the Gigli type, and cotton or wire superior to silk as suture material. It is technically impossible to employ skin clips to unite the fascia and skin in obese patients; I prefer towel clips. . . . Dressings are applied to the stump sparingly in order to permit the use of ice bags around the stump for about four days. The stump may be defrigerated gradually by removing the ice bags individually, beginning on the third day. Generally the patient may resume normal eating after surgery with attention being given to control of pain which is thought to be less than that following other types of anesthesia. Stitches must remain in place longer than usual because refrigeration delays healing. . . . The mortality rate in the above small series is 40 per cent but with any other type of anesthesia it might have approximated 100 per cent either from the effect of the anesthetic or from postoperative shock during the recovery period." 9 references.

J. C. M. C.

ADAMS, R. C.; LUNDY, J. S., AND SELDON, T. H.: *Continuous Caudal Anesthesia or Analgesia: A Consideration of the Technic, Various Uses and Some Possible Dangers.* J. A. M. A. 122: 152-158 (May 15) 1943.

"After a preliminary trial of the method of Hingson and Edwards we devised an alternative technic. . . . After instituting this technic and using it in a number of cases we learned that Manalan of Indianapolis had employed a ureteral catheter in a number of cases to produce anesthesia and analgesia for obstetric delivery, although not as a continuous method for the relief of pain during the course of labor. Thus, as often happens in med-

ical development, two similar techniques were evolved independently by Manalan and ourselves. . . . We have used and are continuing to use the method of Hingson and Edwards and the one developed by us in both obstetric and surgical cases. Both methods have certain advantages and certain disadvantages according to our present concepts. . . . The needle is inserted into the midline of the caudal canal through the sacral hiatus, which is covered by the sacrococcygeal ligament. Its point is advanced to the level of the third sacral foramen and never higher than the level of the second sacral foramen, owing to the possibility of puncturing the dural sheath. . . . Various local anesthetic agents have been employed, but a 1.5 per cent solution of metycaine has been preferred by most authors. Isotonic solution of sodium chloride is used as the solvent, and the amount of the solution required will depend on the desired concentration of the anesthetic agent and whether or not it is supplied in a concentrated solution or in a solid form. . . .

"An alternative method of continuous caudal anesthesia entails the use of a ureteral catheter. This method was first employed in June 1942 and was evolved in order to eliminate the danger of breakage of needles and the possibility of trauma during labor. . . .

"We prefer a 1.5 per cent solution of metycaine because the duration of the resulting anesthesia is greater than the duration of anesthesia produced with procaine hydrochloride. Unless the patient's blood pressure is abnormally high, 1 cc. of a 1:2,600 solution of epinephrine is added to 66.6 cc. of the 1.5 per cent solution of metycaine. . . . For primiparas the administration of the anesthetic solution is begun when the diameter of the dilating cervix has reached 2 to 3 cm. and when the labor pains have become severe. For multiparas and when labor is advancing rapidly the solution is injected