The Control Of Postoperative Pain By The Use Of Local Anesthetic Pumps

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THE CONTROL OF POSTOPERATIVE PAIN BY THE USE OF LOCAL ANESTHETIC PUMPS

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Pain of some degree is always present in postoperative wounds. Fear of this pain frequently causes the patient to postpone elective surgery or to delay in seeking surgical care for the more acute emergencies. The painful wounds may lead to a marked reduction in vital capacity in certain areas of the body. Morphine and other analgesics have had a long and almost universal use to reduce respiratory depression and frequently will complicate the postoperative care of elderly patients.

Small plastic tubes placed in the chest wound at the time of surgery were suggested by Blades and Ford in 1950. They injected 2 cc. of 1% or 2% procaine through these tubes every three hours. They and others used this method with good results. This method has not been widely used. This lack of widespread use has no doubt been due to many factors such as: time-consuming injections every three hours, brief duration of procaine anesthesia and the potential admission of bacteria by the numerous injections.

The recent introduction of new local anesthetic drugs with quicker action and longer duration when compared to procaine has not removed the many undesirable features of intermittent injections. In an effort to correct this, we began the use of small local anesthetic pumps which could be included in the dressing or held in place with strips of adhesive tape. (Fig. 1) These pumps have been made to

Figure 1

Arrow points to small plastic tube brought out through dressing. The local anesthetic group is taped to the patient. The new models will be smaller and much easier to incorporate in the dressing. The basic principle of this pump has been used for many years for other purposes.

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contain enough local anesthetic solution to run for at least 24 hours. Little models of our tube feeding pump run by an electric motor were first used. However, the electric cord added certain potential problems and hazards. Spring wound mechanisms so far have been too heavy and bulky and have lacked sufficient power. The most recent pump consists of a nylon or stainless steel tank divided into two chambers by a rubber diaphragm. The pressure to operate the pump is supplied by introducing oxygen or CO₂ in one tank with the local anesthetic solution occupying the other side. The rubber diaphragm is necessary to prevent the escape of gas into the wound. The delivery rate of the solution is governed by a needle valve and the gas pressure. No electric cord is required. The outside shape is now being changed to that of a small elongated cylinder (resembling a hot dog bun) which makes the pump much easier to tape in place.

Up to the present, pumps have been used mostly for upper abdominal wounds which are well recognized for their postoperative discomfort and reduction in vital capacity. Small plastic tubes have been placed in the wound depths at the time of closure. Fine silk and plain catgut sutures have been used to hold these tubes in place. In these cases, we have attempted to place the deep tube openings near the main nerve trunks supplying the area of the wound.

The individual reaction to pain is subject to wide variation. The use of local anesthetic in the wound has seemed to give a definite significant decrease in the postoperative use of Demerol, morphine and other similar analgesics. Many of the patients will request postoperative medication for headache, nervousness and insomnia rather than for pain in the operative site. Postoperative breathing and ambulation have shown definite improvement in the majority of the patients. Many of the cases have seemed to exhibit a decrease in postoperative abdominal distention and nausea.

For most cases, we have used 1% and 2% Xylocaine. The amount has averaged from 30 to 50 cc. every 24 hours through each tube. We have not observed any undesirable effects on the healing of wounds. The pumps have seemed to give the most benefit during the first 48 to 72 hours when one would expect the major portion of postoperative wound discomfort. We are now planning an extensive controlled program as a cooperative effort with our Department of Anesthesia. The method is simple and is not time-consuming. We have had sufficient experience to predict that postoperative wound discomfort in most patients can be definitely decreased. The majority of patients are indeed grateful for the help in reducing the postoperative wound discomfort.

REFERENCE