CAUDAL ANESTHESIA IN OBSTETRICS: A COMBINED PROCAINE-PONTOCAINE SINGLE INJECTION TECHNIC *

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SINCE the introduction of caudal anesthesia in obstetrics by Stoeckel in 1909 (1), many variations in technic have been reported (2, 3, 4, 5), each offering distinct advantages and disadvantages. The purpose of this paper is to point out the advantages of the use of procaine-tetracaine combination as the anesthetic agent in caudal anesthesia used at the end of the first stage of labor. Pontocaine hydrochloride, a brand of tetracaine hydrochloride,† was employed in all cases.

The decreased time interval between the completion of the injection of the anesthetic agent and the complete relief of pain as obtained with a procaine-tetracaine solution in our opinion makes this the ideal anesthetic mixture for caudal injection. The delayed time interval between the injection of the anesthetic agent and the relief of pain has been the chief criticism of tetracaine alone as the drug of choice in caudal anesthesia, although its prolonged action is most desirable (6, 7). Procaine or metycaine is rapid in action, but has the disadvantage of shorter duration of analgesia. This prompted us to choose a combination of drugs in order to achieve optimal results. This combination consisted of a 30 cc. volume of a 1.5 per cent procaine and 0.15 per cent pontocaine with the addition of 5 drops of 1:1000 epinephrine hydrochloride.

In a review of the available literature at our library, we were unable to find any references to the use of this combination of drugs, and very few articles on terminal caudal anesthesia. Therefore, we are submitting the results of our experience in 200 obstetrical cases.

When the obstetrical wards were opened in May 1947, it was decided to employ some form of caudal anesthesia. As we had had experience with continuous caudal anesthesia with both the catheter and the malleable needle technic, in which solutions of tetracaine, procaine and

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metycaine were used on male and female patients, as well as single injection caudal anesthesia, for various surgical procedures, we were aware of the advantages of this type of anesthesia in obstetrics. Since the proper use of continuous caudal anesthesia requires constant supervision by trained personnel, who were not available to us, its use on our service was not practical. On the other hand, the use of combinations of meperidine hydrochloride (demerol), hyoscine hydrobromide, and the barbiturates, during part or all of the first stage of labor in conjunction with terminal caudal anesthesia, was practical and safe with the limited trained personnel available.

Tetracaine was chosen as the anesthetic agent for caudal anesthesia because of its long duration of action and low toxicity. The long interval between the time of injection of the anesthetic agent and relief of pain, usually from twelve to thirty minutes, frequently became a serious disadvantage when the agent was administered at the end of the first stage of labor. Those who have reported on this drug before, used it earlier in labor when the patient was not in as much distress as when terminal caudal anesthesia is induced. We have found that metycaine and procaine do not supply a duration of analgesia that will allow delivery and repair unless one hurries, and cannot often be administered as early as desired in multipara. For this reason, a procaine-tetracaine solution was selected with the result that relief of pain occurs in one to five minutes after injection, and the duration affords ample time for delivery and repair. This duration is usually from two to five hours.

Our results have paralleled those of Baptisti (8) and others (2, 9), and we agree with them that terminal caudal anesthesia is a satisfactory procedure for delivery and repair, especially for those obstetricians who do not have the time or trained personnel to devote to continuous caudal analgesia. Its use avoids certain disadvantages we have previously encountered when it is employed earlier in labor: (1) it avoids the use of an oxytoxic and its inherent dangers in the first stage; (2) the incidence of manual rotation and Scanzoni maneuvers is not increased, and (3) there is no increase in the incidence of postpartum complications.

Technic

Primiparas are anesthetized at the end of the first stage of labor, and multiparas when dilatation is 7 to 8 cm. The patients are taken to the delivery room and placed on the delivery table in a left lateral position. This facilitates the procedure as all anesthetic, emergency and resusitative measures are centralized. A fast-acting barbiturate (seconal) is given before the anesthesia to help combat any possible reaction to the cocaine derivatives to be injected. The sacral area is scrubbed with tincture of green soap, rinsed with sterile water, and a generous amount of tincture of metaphen is applied. A spinal drape

sheet is then placed over the sacral area, and the anatomy of the region is identified as described by Lundy (10). A skin wheal is made over the sacrococcygeal ligament with a 1 per cent procaine solution. The index finger or the thumb of the left hand is placed over the sacral cornua, while a number 20 gauge spinal needle is grasped in the right hand, and inserted at an angle of 30 to 45 degrees with the skin of the back and with the bevel facing the operator. It is then guided into the depression occupied by the digit of the left hand and through the sacrococcygeal ligament. As soon as the ligament is penetrated, which is felt by a sudden snap, the bevel is rotated 180 degrees, and the angle is dropped to 10 degrees. Care is exercised at this point to keep the needle in perfect line with the caudal canal while pushing the needle 2.5 to 5 cms. cephalad. Care at this point avoids injury to the periosteum which might result in a bloody tap or the inability to pass any bony obstruction, falsely indicating that the patient might have a bony abnormality.

The criteria for verifying the placement of the needle is described in detail by Brown (2). We have also found the following points helpful in assuring success with this technic:

(1) The index finger and the thumb of the left hand are placed over the posterior superior iliac spines and the stilet removed as the first motion after the needle is in place. The stilet is placed on the skin parallel to the needle in the canal. This will demonstrate how close the bevel is to the second sacral interspace which is the end of the normal dural sac.

(2) Procaine solution, 0.5 cc. of a 1 per cent solution, is injected into the spinal needle with the syringe used in making the skin wheal. This lowers the incidence of bloody taps by pushing away the venous plexuses from the bevel and also pushes away the dural sac before aspiration. Gentle firmness in aspiration is important at this point.

(3) A positive sciatic sign, either unilateral or bilateral, is seen with rapid injection of solutions. We believe this to be the most accurate sign indicating proper placement of the spinal needle. It was present in over 90 per cent of our cases.

We recommend the use of a test dose of 8 cc. and waiting an interval of five minutes, to note any evidence of sensory or motor changes in the dependent extremity or the cessation of labor pains. The patient is then given the remaining 22 cc. of the solution. This entire anesthetic agent contains 1.5 per cent of procaine (450 mg.), and 0.15 per cent of tetracaine (45 mg.). The volume of solution used varies between 28 cc. and 33 cc., according to the size of the individual, whether she is unusually small or large in stature. The anesthetic solution should be injected fairly rapidly, and should meet very little resistance. The needle is withdrawn immediately after injection, and the patient is placed on her back to prevent unilateral anesthesia. Patients may be placed in

lithotomy position, and perineal preparation carried out as soon as desired, as all pain will be relieved in a maximum of five minutes.

Complications (11) will not be discussed in this paper, but one should be familiar with those associated with caudal block, and know the emergency treatment for each.

OBSERVATIONS

Probably the most interesting phenomenon that we have encountered in our experience with caudal anesthesia is the variation in levels of anesthesia in patients who are, and those who are not, pregnant. We have given this subject close observation during this series. Assuming that the volume and strength of solution used, size of needle or catheter, speed of injection, and size of patient all play a direct part in the sensory level a caudal block will obtain, one would believe that a given set of individuals would react the same. This, however, was not true in our series. Grodinsky (12) demonstrated in 1929 that usually 40 cc. of fluid will occupy the epidural space from the level of the seventh thoracic to the tenth thoracic segments. Methylene blue, 40 cc., which he injected into the sacral hiatus of the dissecting room cadaver was found at approximately the same level as the sensory level obtained when 40 cc. of a 1 per cent solution of procaine was injected into a living person. This level, he stated to be around the eighth and ninth thoracic segments. The conclusion to be drawn from this is that the level of anesthesia in the living nonpregnant patient and the cadaver are the same in direct proportion to volume. Hingson (6) stated that he performed a similar experiment with 60 cadavers, using 30 cc. of indigo carmine, and found that the level varied from the sixth to the eleventh thoracic segment. Using the same volume of a 1.5 per cent metycaine solution on the living pregnant patient in labor, he usually obtained complete analgesia which indicated a level of the eleventh thoracic or above. The conclusion drawn from this report is that volume is the most important factor in determining the level of anesthesia in any patient, whether pregnant, nonpregnant, or even a cadaver. Our findings have not supported this conclusion.

On the surgical service of this same hospital, we have given caudal anesthesia for circumcision, curettage, rectal and perineal surgical procedures. The same operators, same equipment, simliar premedication and same technic were used on both the obstetrical and surgical services, yet the resultant levels of anesthesia were not comparable in both groups of patients. In surgical patients, 30 cc. of an anesthetic agent injected into the caudal canal will rarely produce a level to or above the first lumbar segment. In many cases we have used up to 45 cc. and even with this large volume we seldom obtain a level above the eleventh thoracic. In obstetrics we nearly always obtain a level of from the eighth to the eleventh thoracic segment with a volume of 30

cc. We have given caudal anesthesia under many varied conditions: with and without labor pain, with head on the perineum, or as high as a zero station, and even, on a few occasions, when the patient was flaccid after administration of open drop ether (given to prevent precipitation), the level attained was the tenth thoracic or above. These observations seem to point to increased abdominal tension as the only obvious and accountable factor to which a difference in levels between pregnant and nonpregnant patients can be attributed.

The need for catheterization is not increased with terminal caudal anesthesia. The incidence in our series was 1.5 per cent, which is lower than other averages reported.

Postpartum hemorrhage occurred in only one case (0.05 per cent) in this series, and was associated with a low implantation. The use of ergonovine malleate administered intravenously with presentation of the anterior shoulder is another responsible factor in controlling blood loss in our series.

Backache is commonly reported during the postpartum state, and is often attributed to caudal anesthesia. We have adopted the procedure of carefully raising and lowering the legs to and from lithotomy position on the delivery table, and have reduced the incidence of this complaint except in patients who suffered with this condition prior to delivery.

Since terminal caudal anesthesia was used, the incidence of manual rotation or Scanzoni maneuvers was not increased to any marked degree.

Very little change in blood pressure was encountered.

No infections occurred at the site of injection.

Sensitivity to the anesthetic agent was demonstrated in one case by convulsions which occurred twelve minutes after injection.

SUMMARY

A combined, single injection technic for terminal caudal anesthesia in obstetrics is discussed.

Observations on 200 obstetrical cases in which this procedure was used are mentioned, with emphasis placed on the varied level of anesthesia which exists in a patient who is in the last trimester of pregnancy and in those who receive caudal anesthesia for other reasons.

The rapidity of action in conjunction with the duration of anesthesia of this combination of anesthetic agents makes it ideal for terminal caudal anesthesia.

We believe this is a very satisfactory method of obstetrical anesthesia for the busy obstetrician or for those who lack adequately trained personnel for continuous caudal method. It is a simple and rapid technic which offers most gratifying results.

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