

PROLONGED REGIONAL ANALGESIA IN SCLERODERMA

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EISELE AND REITAN¹ reported that prolonged sensory anaesthesia resulted from infiltration and nerve block with lidocaine 1 per cent in a patient with Raynaud's phenomenon due to scleroderma. The mechanism for this effect is not known but it is possible that, since there is a reduction of 30 per cent to 50 per cent in the blood flow to subcutaneous tissues of the forearm in scleroderma,² the tissue pH may be lower than normal in this condition. This would decrease the amount of lidocaine present as the un-ionized base,³ and may alter its diffusion through tissue barriers⁴ which may, moreover, be abnormal in scleroderma. These factors would then act in association with decreased vascular absorption, which is likely associated with decreased tissue blood flow.

In the following case attempts were made to increase regional perfusion and to raise tissue pH. The effects on lidocaine analgesia were then observed.

CASE REPORT

Studies were conducted on a 61-year-old woman who first presented with paraesthesiae of both hands in 1955. By 1960 Raynaud's phenomenon with ulceration of fingers of both hands necessitated bilateral clavico-dorsal sympathectomy, with good results. In 1964 paraesthesiae were noted again and when dysphagia developed in 1969 the initial diagnosis of collagen disease was altered to systemic scleroderma. She was admitted in August 1972 for amputation of her right index finger because of severe ulceration.

Low molecular weight dextran infusion. As vascular absorption may be decreased in the presence of inadequate tissue blood flow, an attempt was made to increase tissue perfusion by infusing low molecular weight dextran. If the persistence of analgesia were due to inadequate tissue perfusion, the improvement of tissue blood flow might be expected to lead to a reduction in the duration of analgesia.

No premedication was administered and prior to operation an intravenous infusion of low molecular weight dextran 10 per cent in 0.9 per cent sodium chloride solution was set up and a digital nerve block was done as described by Lee,⁵ utilizing 5 ml of 1 per cent lidocaine HCl without adrenalin and without tourniquet. Fifteen minutes later amputation proceeded painlessly. Sensation distal to the block was tested every 15 minutes and 10 hours elapsed before there was any return of pain sensation. Twenty-four hours elapsed before full sensation had returned.

Infiltration analgesia of apparently normal skin. Prolonged analgesia following infiltration of apparently normal skin with lidocaine in a patient with scleroderma was noted by Eisele and Reitan. Tissue pH may be lower than normal in sclero-

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derma, thereby diminishing the un-ionized proportion of lidocaine and delaying its diffusion. Sodium bicarbonate infusion raises systemic pH and so tends to raise tissue pH.

The hypothesis that low tissue pH might be a cause of prolonged lidocaine analgesia was therefore tested in the following manner:

(i) On the volar surface of the left forearm of the same patient two marked circles 1 cm in diameter were infiltrated with 1 ml of lidocaine solutions 1 per cent and 0.1 per cent respectively. Two hours and fifteen minutes elapsed before slight pain sensation returned in the circle infiltrated with 0.1 per cent lidocaine and four hours and forty-five minutes after injection slight pain was experienced in the 1 per cent circle. Sensation continued to return slowly, but seven and one half hours passed before both areas regained full sensation.

(ii) On a subsequent occasion an infusion of sodium bicarbonate 0.5 mEq/ml was given into the right antecubital vein at a rate of 2 mEq/kg/hour. Twenty minutes from the beginning 1 cm circles on the volar surface of the left forearm were infiltrated with 1 ml of 1 per cent lidocaine and 1 ml of normal saline respectively. A sample of venous blood was taken from the left antecubital vein 20 minutes later. Serum bicarbonate was 42 mEq/litre and pH 7.8. The infusion was stopped after one hour. Two hours after infiltration with lidocaine slight pain was felt on testing whereas the saline injection did not cause analgesia. Pain sensation returned to normal in the lidocaine circles within six and three quarter hours.

COMMENT

The infusion of low molecular weight dextran 10 per cent in 0.9 per cent sodium chloride during regional nerve block with lidocaine 1 per cent did not result in a lesser period of analgesia than that reported by Eisele and Reitan, when 10 hours elapsed before any return of pain sensation and 24 hours before full sensation returned. Thickened vessels with narrowed lumens are present in scleroderma and its treatment with dextran solutions has been tried without marked success.

The period of effective analgesia following cutaneous infiltration of 1 per cent lidocaine was reduced from 285 minutes to 120 minutes by the administration of sodium bicarbonate solution. Tissue pH was not measured so that it is not known whether it was effectively altered or if there was improved perfusion. Skin testing with lidocaine of patients suspected of suffering early scleroderma might possibly be used as a diagnostic aid.

SUMMARY

A case of prolonged regional analgesia is reported in a patient with severe scleroderma. The administration of sodium bicarbonate solution reduced the period of effective analgesia from 285 minutes to 120 minutes, following cutaneous infiltration of apparently normal skin with 1 per cent lidocaine.

RÉSUMÉ

On a rapporté¹ qu'une anesthésie sensitive prolongée avait suivi une infiltration

locale et un blocage nerveux à la Xylocaïne à 1 pour cent, chez un patient atteint de sclérodémie. Le mécanisme de cet effet n'est pas connu, mais il est suggéré que puisqu'il y a diminution de 30 à 50 pour cent de la circulation sous-cutanée de l'avant-bras dans la sclérodémie,² l'anesthésie résiduelle prolongée pourrait être causée par une diminution d'absorption de l'agent, par la diminution du pH tissulaire qui diminuerait la proportion de Lidocaïne non ionisée³ et que ces divers facteurs pourraient modifier la diffusion de l'agent dans les tissus.⁴

Les auteurs rapportent un cas d'analgésie régionale prolongée chez un malade atteint de sclérodémie. L'infiltration de dextran à bas poids moléculaire n'a pas contribué à améliorer la situation.

Par ailleurs une infiltration de Bicarbonate de Sodium a raccourci la période d'analgésie après injection de Xylocaïne dans un territoire cutané apparemment normal.

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