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The effects of different glucose concentrations on bupivacaine anaesthesia in buffalo calves

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Bupivacaine hydrochloride a long acting local anaesthetic has a wide variability in its extent of spread in body system (Logan *et al.* 1985). Addition of glucose to local anaesthetic enhances the duration of anaesthesia (Lee *et al.* 1988). In this study the effects of various glucose concentrations of bupivacaine on its spread and anaesthetic effects were observed in buffalo calves.

Healthy, 1 year old buffalo calves (24) of either sex were divided into 4 groups of 6 animals each. In group 1 animals bupivacaine hydrochloride (0.5%) @ 0.75 mg/kg body weight was injected for lumbar segmental epidural block. While the animals of groups 2,3 and 4 were subjected to bupivacaine with 0.33%, 0.83% of glucose solutions for lumbar segmental block respectively, @0.75 mg/kg body weight.

The extent of spread of anaesthetic and upper level of analgesia was assessed by pinpricks. Motor power of limbs was assessed by degree of motor incoordination in the limbs. The time taken (min) for disappearance and reappearance of reflexes like,tail, anus, perineum, sacral, thigh, pedal, lumbar cranial, lumbar caudal, abdomino cranial and abdomino caudal was recorded.

Plain bupivacaine produced analgesia up to posterior flank region. Bupivacaine with 0.33% glucose administered animals showed analgesia and desensitization up to mid flank 0.83% glucose administered bupivacaine solution produced analgesia up to 10th thoracic vertebra level and with 8% glucose concentration up to seventh thoracic vertebra level.

Tail reflex abolished first in all the groups in which group 4 showed early loss of reflex. Various other reflexes like anal, pedal etc., disappeared quickly in group 4 compared to other 3 groups. Motor incoordination in plain bupivacaine injected group started in 11.16±0.47 min, and in 9.5±0.56 min, 8.83±0.3 min and 7.5±0.42 min groups 2, 3 and 4 respectively.

Animals recovered in 272.16±0.94, 374.00±; 1.75; 380.16±1.24; and 460.18±21.4 min has in groups 1,2,3 and 4 respectively.

Hyper baric solution of bupivacaine with glucose solution produced more cephalad flow and paralysed nerves supplying diaphragm leading to respiratory arrest. Out of 6 animals injected bupivacaine with 8% glucose 2 animals died due to respiratory arrest. The remaining animals took longer time to recover. Bupivacaine with 0.83% glucose produced satisfactory analgesia with comparatively quick abolition of reflexes permitting surgical operations than group 2. A solution containing 0.33% glucose + bupivacaine produced slightly quick abolition of reflexes (Bannister *et al.* 1990). However, 0.83% bupivacaine solution produced satisfactorily analgesia without respiratory arrest. Ashyper baric solutions generally more under the influence of gravity, it would seen that the baricity of 0.83% glucose solution was sufficient to ensure cephalad movement of solution which confirms the findings of Logan *et al.* (1986) in human patients. On the basis of various reflexes it was found that 0.83% glucose bupivacaine solution could be safely used.

SUMMARY

Bupivacaine hydrochloride with different glucose combinations was epidurally given in buffalo calves and the effects on the basis of various reflexes were studied. It is concluded that 0.83% glucose bupivacaine solution could be safely used for epidural anaesthesia.

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