

Study of Single Subcutaneous Injection for Digital Block Using Lignocaine with Adrenaline

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ABSTRACT

It is known fact that adding adrenaline to local anesthetic gives many advantages but it is not practiced commonly in digital anaesthesia due to fear of ischemia due to resultant vasoconstriction. Total five cases were there. All patients received lignocaine with adrenaline in digital block. Recent literature and our findings both suggest use of adrenaline in at least a well perfused finger is safe and may give some potential advantages.

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INTRODUCTION

Finger injuries are one of the most common injuries accounting for around 20% of the emergency department visits.¹ One study carried out in a tertiary center in Nepal showed that 7.5% of all the orthopedics cases in emergency registry were hand and wrist injuries.² Many of these injuries can be managed conservatively. If surgery is required, digital block is very effective form of anesthesia.³ Adrenaline, when added to local anesthesia gives many advantages. It is said to shorten latency of anesthesia, lower the dose of local anaesthetics, temporarily cause vasospasm which may allow us to avoid tourniquet, prolong the duration of anesthesia and analgesia postoperatively.⁴ Even with these facts, our traditional teaching has been to avoid adrenaline in digital block because of risk of vasospasm leading to digital ischemia.

CASES:

All the cases were of traumatic finger tip injuries

Two ml of the plain lignocaine with 1:200000 adrenaline solution was injected in the center of volar palmodigital crease of the injured finger subcutaneously using a 26 G needle slowly with needle perpendicular to skin as described by Harbison.⁵ Injection Phentolamine was kept ready to reverse any possible ischemic effect due to adrenaline.⁶

Case 1

23 year old male with traumatic amputation of right long finger. He underwent Atasoy V-Y plasty. Onset of anaesthesia was at 3 minutes 30 seconds and duration of anaesthesia was 5 hours 10 minutes.

Case 2

22 year old female with traumatic injury to right index finger. She underwent nail bed repair. Onset of anaesthesia was at 6 minutes 30 seconds and duration of anaesthesia was 6 hours 30 minutes.

Case 3

21 year old male with traumatic injury to left index finger. He underwent revision amputation and stump closure. Onset of anaesthesia was at 4 minutes 30 seconds and duration of anaesthesia was 5 hours.

Case 4

40 year old female with traumatic injury to left index finger. He underwent nail bed repair. Onset of anaesthesia was 2 minutes 30 seconds and duration of anaesthesia was 5 hours

Case 5

34 year old male with traumatic amputation of left ring finger. He underwent revision amputation and stump closure. Onset of anaesthesia was at 3 minutes 30 seconds and duration of anaesthesia was 5 hours.

There was no incidence of ischemic insult to any of the anaesthetized finger post operatively.

DISCUSSION

It has been a traditional teaching that using adrenaline in digital blocks is unsafe and should be avoided. It is said to cause digital gangrene due to its vasoconstrictive effect on digital arteries.

It is well known fact that due to absence of muscle tissue in fingers, they are known to tolerate ischemia for prolonged period than more proximal parts of the limb so much so that report of successful replantation of finger as late as 94 hours after injury can be found in literature.^{7, 8} A Randomised Controlled Trial (RCT) to study physiological effect of adrenaline showed that adrenaline caused only transient vasoconstriction on digital vessels and were completely reversed by 3 hours after application with no long term complications.⁹ A study to evaluate adrenaline induced vasoconstriction using Doppler study reported that the vasoconstrictive effect of adrenaline was transient and reversed spontaneously at 60-90 mins.¹⁰ Other factors that has been described as cause of gangrene after digital block are excessive tourniquet pressure, excessive volume of anaesthetic agent and use of hot soaks in anaesthetized digit. None of the patients showed ischemia related complications.

In a RCT, comparing onset of anesthesia in patient receiving plain lignocaine and lignocaine with adrenaline, after 10 minutes of administration of anaesthesia surgical intervention could be initiated in 48% of patients in plain lignocaine group compared to 84% in lignocaine with adrenaline group.¹² In our study mean time of onset of anaesthesia was 4.1 minutes. Mean duration of anaesthesia in the same RCT was 4.6 hours.¹² Our study showed mean duration of 5.4 hrs.

Another potential advantage of adding adrenaline to lignocaine is decreased blood loss or decreased need of finger tourniquet. A study showed that intraoperative blood loss was significantly more in plain lignocaine group compared to lignocaine with adrenaline group.¹² In our study group almost only 40% of the patient required tourniquet during surgery which was decided by the surgeon intra-operatively based on bleeding.

Mean pain score in our study was less than that has been reported for other techniques of digital block.¹³ This could be due to technique we used which only requires single injection with just 2ml of solution and a 26G needle.

Though our expected sample size was larger (39), due to COVID 19 pandemic situation we could not meet the sample size. This limits our ability to draw any definitive conclusion from our study. But now that we have not seen any ischemic complications with our patients till now, we do plan to conduct a RCT with a larger sample size.

CONCLUSION

Contrary to the general belief, there are some evidences to show that using adrenaline with local anaesthesia in digital block is safe and may even give some advantages, at least in patients without any vascular insufficiency and vasculitis. Though our findings also suggest that use of adrenaline in digital anaesthesia is safe and could give potential benefits over plain lignocaine, small number of cases limits our ability to draw any concrete conclusion. More good quality studies are required before making it a routine practice.

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