A brown horse is shown in profile, facing left, in the foreground. The background features rolling hills under a dramatic sky with orange and yellow clouds, suggesting a sunset or sunrise. The overall scene is warm and scenic.

Comparison Between Intravenous Regional Analgesia and Nerve Block, Onset of Action and Efficacy on Desensitization of Distal Forelimb In Equines

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Introduction



- The most common hazards of equine is lameness due to problems in there distal limbs.
- Which may need a surgical intervention that cause pain

The Pain

- An unpleasant sensory and emotional experience associated with actual or potential tissue damage.



. Lameness In Equine



- Causes negative impact on animal working ability, anorexia, severe pain and affect reproductive.
- All of these may lead to significant economic loss.

Pain Management



- To avoid distress result from post-operative pain, pain management is very important.
- To control the operation and post-operative pain by using local or regional analgesia that may lead to better out comes.

Regional Analgesia



Two ways of regional analgesia can be applied, including intravenous regional analgesia (IVRA) and nerve block such as high or low volar nerve block

Intravenous Regional Analgesia (IVRA)



1. Not commonly used
2. One site of injection
3. Less anesthetic agent
4. Using esmarch bandage

Advantages:

- a) Bloodless field
- b) Restrict moving up of the analgesic agent

Disadvantages:

- a) Tissue damage
- b) Traumatic nerve injury
- c) Local oxidative stress
- d) Ischemic pain

Nerve Block (NBA)



- Advantages:

1. Appropriate nerves are anaesthetised
2. Peri-neural injection
3. No esmarch bandage

- Disadvantages:

1. Individual variation of nerves
2. Need good skills in topographical anatomy
3. Bleeding and oozing

The Study

- The aim of this study is to compare IVRA and the nerve block techniques in terms of onset, the stress response and pain reflex on working equine



Method



Animals

- 12 working donkeys, weighted ± 150 kg, not pregnant, was not giving any pain killer at least during last 10 days collected and randomly divided in to two groups.
- Each group will received hay and barley. Each group will be kept in free move and good bedding box stall.

Preparation of Experimental Animal

- A day before experiment, the right jugular furrow prepared as for surgery, indwelling catheter introduce in jugular vein and fixed with skin,
- By the end of day the catheter removed.



Restrain of The Animal



- it is essential to secure the head as a first step in control by applying head collar with rope.
- limits the animal's opportunity to move by lifting the required leg.

Intravenous regional anaesthesia

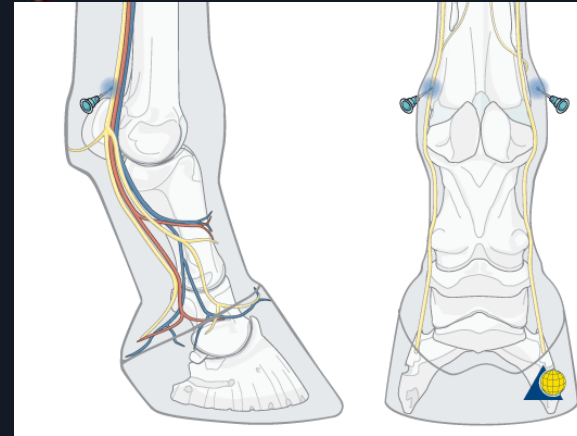
- Digitalis palmaris communis III vein used for IVRA, the site of injection clipped, shaved and scrubt.
- 5 ml of lidocain4% injected after fixation of esmarch bandage at the proximal mid-shaft of metacarpal.



Nerve block analgesia(NBA)



- A high volar (palmer) nerve block used according to(L.W.Hall).
- An esmarch bandage used additionally.
- Using high medial and lateral palmar n. is detected with finger.
- At medial and lateral nerves, 5 ml of lidocane 4% injected after preparation for injection as before.



Monitoring Test of desensitization by mechanical nociceptive stimulation

- Desensitization tested by means of pinching different sites using a hand-held Medio-Line with a blunt tip.



Vital signs



- Through out the pain test heart rate, respiratory rate and rectal temperature will be measured and written down after every pain test.

Blood samples

Collection and storing

- blood samples will be taken in serum tubes after each pain test and before regional analgesia as in the table below using the indwelling catheter.
- Serum was collected from all samples by centrifuge for 15 min at 3500 rpm and stored at -18C.



Table work

Planned hour	Recorded true hour	Time of C (min)	Time to LA (min)	Time to pain test (min)	Procedure	Blood sample #	execution
8:00		-10			Bring the animal to the surgery location		
8:05		-5			Blood sample, HR, RR, and rectal temperature are taken	1	
8:10		0	-5		Restrain of the animal		
8:14		4	-1		Blood sample, HR, RR, and rectal temperature are taken	2	
8:15		5	0		Esmarch bandage and IVRA or NBA		
8:17			2	0	Starting of Pain tests		
8:20			5	3	Blood sample, HR, RR, rectal temperate Then pain test	3	
8:23			8	6	Blood sample, HR, RR, rectal temperate	4	
8:25			10	8	Pain test		
8:28			13	11	Blood sample, HR, RR, rectal temperate	5	
8:30			20	18	Pain test		
					The end of pain test		
8:33			23	21	Blood sample, HR, RR, rectal temperate	6	
8:34					Remove the tourniquet		
8:40					Release the animal		

Analysis

- Serum will be used to measure the level of non-steroidal fatty acid, lactate, epinephrien and cortisone.



Results



- Before regional analgesia application in both groups, all equines showed aversive response at the mechanical stimulation at both sides of the posterior surface of pastern and fetlock region and the soft skin immediately proximal to heel bulb.

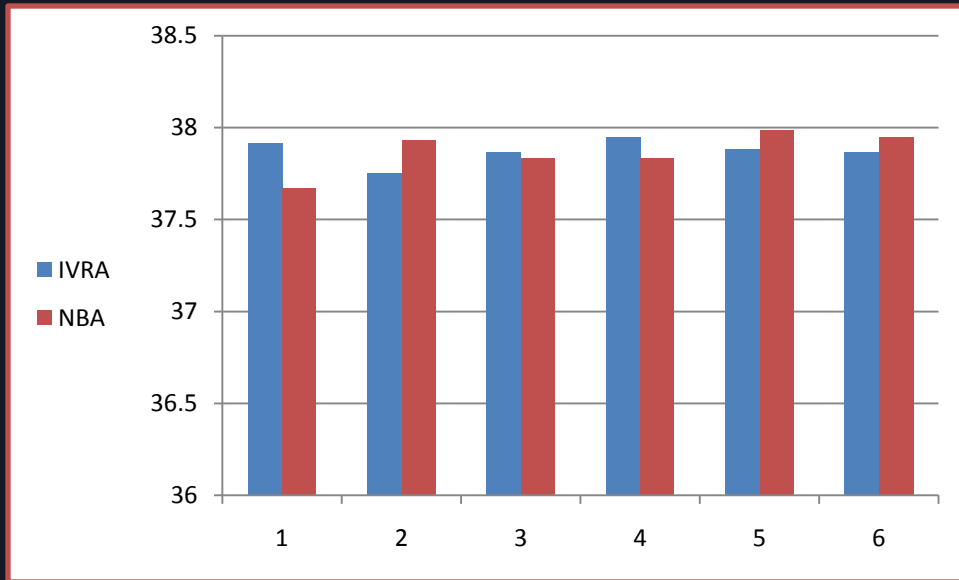
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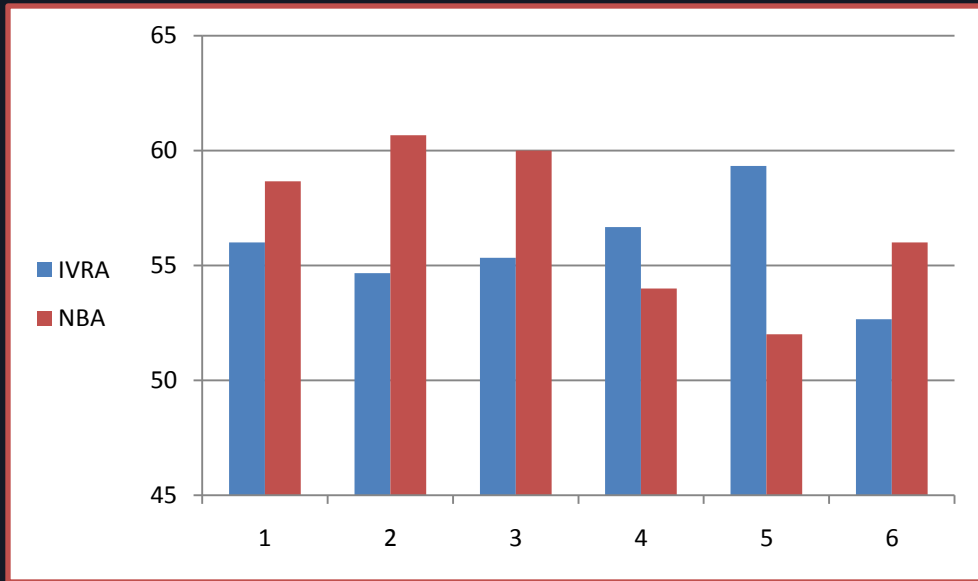
- After regional analgesia in each group, No equine showed a response at any level of tests after 2min of LA in NBA group.
- IVRA group needed about 20min to make a no response in tests, it was showing deferent degrees of responses at 2, 5, 10 min tests.

Temperature:



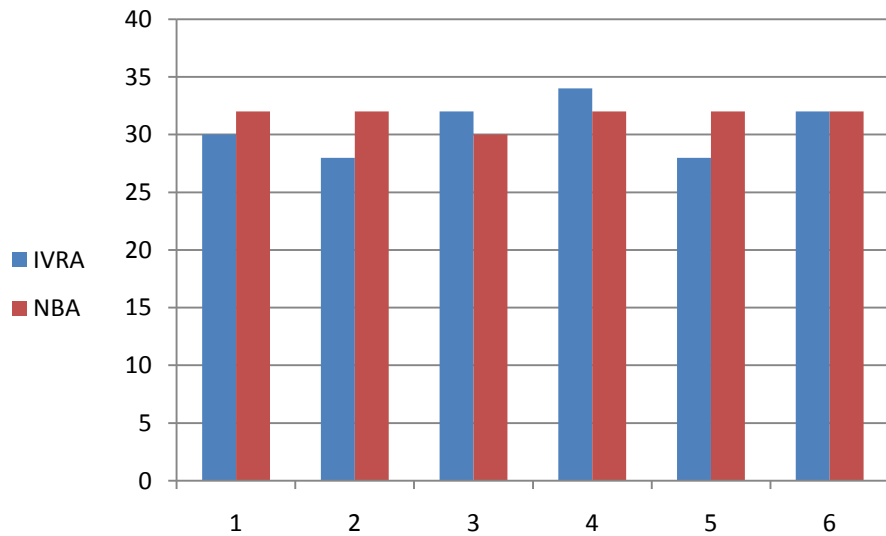
$P=0.46$

Heart rate:



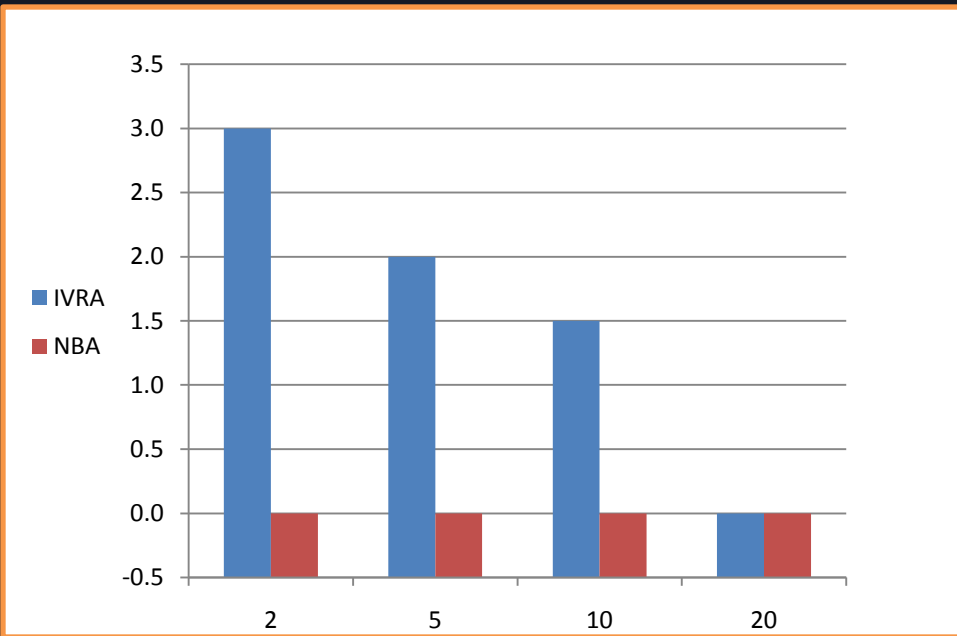
$P=0.26$

Reparatory rate:



$P=0.1$

Pain test:



$P=0.02$

Discussion and Conclusion



- Despite the small sample number in this study, the results from the mechanical stimulation indicate that intravenous regional anesthesia and fore limb tow points nerve blocks completely desensitize the distal limb in working equine.



- However, complete desensitization developed significantly faster after NBA (2 min) than after IVRA (≥ 20 min).



- This study found no specific stress responses on HR and RR, but they may have been masked by the responses of the animals to restraint.



- The time difference until complete desensitization between both RA techniques in this study appears clinically relevant, as distal limb anesthesia is often necessary for major Hoof surgeries under time constraints in the field.

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