Haematological and Biochemical changes during Epidural Xylazine hydrochloride anaesthesia in Dogs

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Abstract

Atropine sulphate was given @ 0.04 mg/kg body weight I/M 15 minutes prior to the xylazine HCL anaesthesia @ 0.75 mg/kg b.wt at the lumbosacral epidural space and haematological and biochemical parameters were evaluated. A significant decrease in haematological parameters viz. TEC, PCV, Hb and non-significant decrease in TLC and platelet count whereas significant increase in ESR was observed. A significant increase in serum glucose value was recorded while the other biochemical parameters like SGOT, SGPT, and BUN significantly altered whereas no change in serum creatinine value was also recorded.

Keywords: Xylazine hydrochloride, Atropin sulphate, haematological, biochemical.

Introduction

Xylazine HCL is a centrally acting non-narcotic analgesic with sedative and myorelaxant properties, has potent local anaesthetic properties, which is chemically designated as 2 (2, 6 - dimethyl-phenyl-amino- dihydro-1,2 thiazime hydrochloride 4H-5-6). Xylazine HCL, which used intravenously or intramuscular, produces dose dependent depression of cardiopulmonary function. However, its utility was found better for the induction of epidural analgesia without much alteration in cardiopulmonary function in baffuloes (Tiwari and Kumar, '98[b]), horses (Le Blanc and Eberhart, '90) and goats (Adetunji *et al.,* '02).

Material and Methods

The present study was conducted on six clinically healthy mongrel dogs of either sex, 2 to 5 years old and weighing 10 to 20 kg presented for major and minor surgical interventions. All the dogs were given atropine sulphate @ 0.04 mg/kg b.wt i/m 15 minutes prior to Xylazine HCL anaesthesia 0.75 mg /kg b.wt at the lumbosacral epidural space.

For haematological parameter viz. Hb, PCV, TLC, TEC, ESR and platelet count, blood samples were collected aseptically from femoral vein in a sterilised vial containing EDTA 1% as an anticoagulant and they were determined by using automatic cell counter (make-medonic-merk (A-5301) at 0 minute before the administration of drug and then at 10, 20, 30, 60, 90 and 120 minutes after the administration of drug in all the six animals.

The biochemical parameters like serum glucose, SGPT, SGOT, BUN and serum creatinine were estimated with the help of semi-auto analyzer using standard Kits (Span Diagnostic PVT Ltd, Surat-India) at 0 minute before the administration of drug and then at 10, 20, 30, 60,90 and 120 minutes after the administration of drug in all the six animal. The data collected during the present study in respect of different parameters were statistically analyzed by using analysis of variance as per Snedecor and Cochran (1994) method.

Results And Discussion

In the present study haematological and biochemical parameters were recorded in all the six animals at different intervals, Which is depicted in table-1 and 2 respectively.

Total leucocyte count (TLC) decreased non significantly from the control value of 13.06±0.84 to 11.92±0.85 10^3/c.mm at 20 min interval after epidural anaesthesia. Thereafter it is increased to 12.83±0.83 10^3/c.mm. at 120 min interval. These findings are in accordance with the earlier findings of Kelawala *et al.*,(1996), who reported non-significant decrease in (TLC) after epidural administration of xylazine in dogs. Total erythrocyte count (TEC) showed decreasing trend till 30th min

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after induction from the baseline value of 7.11±0.66 to 6.19±0.66 10^6/c.mm. Thereafter it increased to 6.79±0.63 10^6/c.mm. at 120 min. This significant decrease in TEC supported the observations of Pratap *et al.*, (2002). Haemoglobin (Hb) decreased significantly from the control value of 13.18±0.58 to 11.77±0.45 g/dl at 30 min interval after epidural anaesthesia. Thereafter it increased to 12.60±0.47 at 120 min. Similar findings were observed by Skarda *et al.* (1996) and Kumar *et al.*, (1997). PCV level significantly decreased from the control value of 40.75±1.99 to 36.06±1.65% at 20 minute interval after epidural anaesthesia. Thereafter it increased to 39.00±1.89% at 120 minutes. The above observations of significant decrease in PCV are supported by Jean *et. al.,* (1990), Skarda *et al.* (1996) and Kumar *et al.* (1997) after epidural administration of xylazine. Platelet count decreased non-significantly from control value of 4.05±0.39 to 3.57 ±0.38 lakh/mm at 30 min interval after epidural administration. Thereafter it increased to 3.86±0.37 lakh/mm. ESR increased significantly from the control value of 3.78±0.38 to 4.57±0.39mm at 30 min which increased upto 30 min interval and 14.55 ±0.56 to 15.33±0.58 mm there after at 1 hour which also increased upto 30 min interval. Thereafter the values for 30 min and 1 hour showed decreasing trend upto 120 min interval. The present findings for ESR are in accordance with the earlier findings of Tiwari *et al.*, (1996) who reported significant increased in ESR after epidural administration of xylazine in buffalo calves. The decrease in haematological parameters *viz.* TLC, TEC, Hb, PCV, Platelet count may be due to increase plasma volume during anaesthesia, on account of vasodilatation resulting in vascular pooling (Stefty *et al.*, 1976) or it may be due to sequestration of blood cells in spleen and lungs during anaesthesia (Lumb and Jones, 1997).

Serum glucose level increased significantly after induction of epidural anaesthesia from the pre-induction value of 69.01±2.94 to 86.87±3.37 mg/dl till the 30^{th} min and thereafter decreased gradually till the end of the observation period. The above observations of hyperglycemia are in agreement with Singh *et al.*, (2002) and Dwivedi and Sharma (2004) which might be due to the stress induced gluconeogenesis as a result of anaesthesia and probable suppression of insulin and increased production of glucose in liver.

Serum glutamic oxaloacetate transaminase (SGOT) and serum glutamic pyruvate transaminase (SGPT) values were ranged between 38.2±0.93 to 38.67±0.78 unit/ml and 44.00±1.32 to 45.78±1.65 unit/ml respectively. Analysis of variance showed significant differences for SGOT and SGPT. The above findings for SGPT and SGOT are in accordance with the earlier findings recorded by Pathak (1997) and Pandey and Rao (2000) which might be due to alteration in the cell membrane permeability which may permit these enzymes to leak from the cells with intact membrane, when there is stress or any damage to the liver cells, the enzyme escapes into the blood and so the SGPT,SGOT enzymatic activity increases.(Vikers *et al.*, 1984).

Blood urea nitrogen (mg/dl) increased significantly from the base line value of 18.92±1.13 to 19.50±1.17 mg/dl at 60 min. interval after epidural anaesthesia. Thereafter it decreased to 18.68±0.89 mg/dl at 120 min. The present finding is in agreement with earlier findings of Dwivedi and Sharma (2004), who reported increase in level of BUN following epidural administration of xylazine in buffaloes. In the present study the elevation of BUN is attributed to the temporary inhibitory effects of drugs on renal blood flow which in trun might have caused a rise in BUN. Serum creatinine level (mg/dl) ranged between 1.05 ± 0.09 to 1.12 ± 0.09 mg/dl and analysis of variance showed non-significant difference for serum creatinine level.

Table 1 Mean value ± (SE) of haematological parameters after epidural administration of xylazine hydrochloride in dogs.

Parameter	Time interval (min)						
	0	10	20	30	60	90	120
TLC (10^3/c.mm.)	13.06 ±0.84	12.48 ±0.84	11.92 ±0.85	12.05 ±0.82	12.27 ±0.84	12.57 ±0.84	12.83 ±0.83
TEC (10^6/c.mm.)	7.11 ±0.66	6.60 ±0.71	6.35 ±0.71	6.19 ±0.66	6.40 ±0.67	6.58 ±0.63	6.79 ±0.63
Hb (g.dl)	13.18 ±0.58	12.72 ±0.50	12.35 ±0.48	11.77 ±0.45	11.95 ±0.48	12.30 ±0.46	12.06 ±0.47
PCV (%)	40.75 ±1.99	37.83 ±1.74	36.06 ±1.65	36.41 ±1.87	37.05 ±1.79	38.05 ±1.78	39.00 ±1.89
Platelet (Lakh/mm)	4.05 ±0.39	3.82 ±0.38	3.67 ±0.38	3.57 ±0.38	3.63 ±0.36	3.78 ±0.37	3.86 ±0.37
ESR (mm)	3.78 ±0.38	4.13 ±0.41	4.40 ±0.39	4.57 ±0.39	4.42 ±0.32	4.32 ±0.40	3.97 ±0.36 1
Hour	14.55 ±0.56	14.92 ±0.58	15.18 ±0.56	15.33 ±0.58	15.05 ±0.52	15.02 ±0.50	14.62 ±0.49

Table 2 Mean value ± (SE) of bio-chemical parameters after epidural administration of xylazine hydrochloride in dogs.

Parameter	Time interval (min)						
	0	10	20	30	60	90	120
Serum glucose (mg/dl)	69.01±2.94	75.08±2.71	80.97±3.03	86.87±3.37	84.12±3.11	79.10±2.71	74.63±2.69
SGOT (Unit/ml)	38.20±0.93	38.52±0.80	38.67±0.78	38.55±0.75	38.57±0.71	38.30±0.80	37.97±0.89
SGPT (Unit/ml)	44.37±1.83	45.77±1.55	45.78±1.65	45.77±1.36	45.67±1.47	44.83±1.59	44.00±1.32
BUN (mg/dl)	18.92±1.13	19.13±0.99	19.43±1.04	19.47±1.05	19.50±1.17	19.50±1.06	18.68±0.89
Serum creatinine (mg/dl)	1.12±0.09	1.08±0.11	1.10±0.01	1.05±0.09	1.05±0.08	1.10±0.12	1.10±0.09

References

1. Bhannaria, S., M.K. Bhargava and S.K. Pandey (2000): Indian Journal of Vet. Surgery, 21 (2) : 115.
2. Dwivedi, R.K. and S.P. Sharma (2004): Indian J. Vet. Surgery, 25 (1): 42 - 43.
3. Jean, S. G.; R.T. Skarda and W.W. Meur (1990): *Am. J. Vet. Res.* 51 (8): 1232 - 1236.
4. Kelawala, N.H.; Amresh Kumar; S. Chaudhary; H.N. Singh and H.P. Singh(1996): *Indian Vet. J.,* 73 : 552-557.
5. Kumar, D.D.; A.K. Sharma and O.P. Gupta. (1997): *Indian Vet. J.,* 74 : 496-498.
6. Leblanc, P.H. and S. W. Eberhart (1990b): *Equine Vet. J.,* 22 (6): 389-391.
7. Lumb, W.E. and Jones, E.W. (1997): Veterinary anaesthesia, Lea and Febriqer, Philadelphia.
8. Pandey, S.K and M.LV. Rao (2000) : Indian vet. Med. Journal. (24): 57-58.
9. Pratap, K; P. Kinjavdekar and Amarpal (2002): *Indian J. Vet. Surgery,* 21:116 (Abst. No. 28)
10. Skarda, R.T. and W. W. Muir (1996): J. Ut. Vet. Res. 57 (2): 193-200 (Abst. Source *Vet. Bull.,* 66 (6).
11. Snedecor, G.W and W.G. Cochran (1994): Statistical methods, 8th edition, IOWA State University Press, Ames, IOW, U.S.A
12. Stefty E.P.; Gillespie, J.R.; Berry, J.D. Eger, E.I and Schalm, O.W. (1976): Am.J.Vet.Res. 37:959 - 962.
13. Tiwari,S.K. (1996): Ind. J. Vet. Surgery. (Thesis Abst) Ph.D. G. B. Pant University of Agri and Tech. Pantnager (UP) 263145, 17 (2):137.
14. Tiwari,S.K. and A Kumar (1998b): *Indian J. Vet. Surgery,* 19 (1): 37-38.
15. Vikers, MD.; H. Schnieden and F.G. Smith (1984): Drugs in Anaesthetic Practice- 6th adn., Publication: Butterworths; London. PP.: 63 - 95.

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Dr. Bernard Vallat selected as the first recipient of the Penn Vet World Leadership Award granted by the Vernon and Shirley Hill Foundation

Paris, 21 May 2008 - Dr. Bernard Vallat, Director General of the World Organization for Animal Health (OIE), has been selected as the first recipient of the Penn Vet World Award. The award is given annually to a veterinarian who has dramatically changed the practice and image of the profession and substantially influenced the lives and careers of others.

I can think of no one more appropriate to receive this award," said Dr. Joan C. Hendricks, the Gilbert S. Kahn Dean of Veterinary Medicine. "Dr. Vallat's vision and leadership have changed the practice and image of the veterinary profession throughout the world."

"I am particularly honored to be the first person to receive the prestigious Penn Vet World Leadership Award, and I am thankful to the Vernon and Shirley Hill Foundation for its tremendous contribution to helping us face the exciting challenges of the veterinary profession," said Dr. Vallat. " The work of the veterinary profession and veterinary services is now recognized as a global public good. Support for them in developing and transitional countries is a priority, not only to promote development around the world, but also to protect the world against the spread and the re-emergence of animal diseases and zoonoses."