Involvement of Opioid Receptors and ATP-sensitive Potassium Channels in the Action of Lipid Emulsion against calcium channel blocker toxicity

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BACKGROUND

- Cardioprotective effect of lipid emulsion (LE) in local anesthetic systemic toxicity is via glycogen synthase kinase (GSK)-3 β phosphorylation and inhibition of mitochondrial permeability transition pore (mPTP) opening.
- Opioid receptors and ATP-sensitive K⁺ channels are important modulators of GSK-3 β phosphorylation.
- Lipid emulsion also have a cardioprotective effect in calcium channel blocker (CCB) toxicity, thus we presumed it may be related with (GSK)-3 β phosphorylation and also be through Opioid receptor and ATP-sensitive K⁺ channel activation

MATERIAL AND METHODS

group	0-5min	5-10min	5-12min
1	N/S	N/S	verapamil
2	N/S	intralipid	verapamil
3	naloxone	intralipid	verapamil
4	glibenclamide	intralipid	verapamil

- 8 weeks-old male rats
- HR, SBP, MBP, DBP, RPP measure in carotid artery
- When hemodynamic status stablized, agents are administered intravenously as above protocol.
- Naloxone(non specific opioid receptor antagonist) 5mg/kg IV
- Intralipid 20% 3ml/kg bolus and 0.17ml/kg/min continuously
- Verapamil(calcium channel blocker) 5mg/kg/hr continuous infusion
- Glibenclamide(ATP-sensitive potassium channel blocker) 0.5mg/kg IV

STATISTICAL ANALYSIS

- Values are expressed as **mean $\pm$ SD**.
- Statistical analysis was performed using **anysis of variance**.

RESULTS

- Group 1 shows lower systolic and mean blood pressure than group 2.
(SBP 35.3% vs 63.6%, MBP 31.7% vs 56.9%,p<0.05)
- After naloxone pretreatment, **group 3** shows **lower systolic and mean blood pressure** than group 2.
(SBP 48.3%vs 63.6%,MBP 43.2% vs 56.9%,p<0.05)
- Group 4 shows lower systolic and mean blood pressure** than group 2.
(SBP 25.9%vs 42.5%, MBP 24.2% vs 38.2%,p<0.05)

RESULTS

Fig 1. Group 2,lipid emulsion treated to calcium channel blocker toxicity rat, shows higher in systolic and mean blood pressure than group 1, verapamil only infused. (SBP 35.3% vs 63.6%, MBP 31.7% vs 56.9%,p<0.05.) Group3, pretreated with naloxone, shows lower than group 2 in systolic and mean blood pressure (SBP 48.3%vs 63.6%,MBP 43.2% vs 56.9%,p<0.05)

Fig2. Group 1 shows lower systolic and mean blood pressure than group 2, which was treated with intralipid20%. (SBP24.8%vs 42.5%, 28.2% vs 38.2%, p<0.05) Group 4, pretreated with glibenclamide, shows lower than group2 in systolic and mean blood pressure. (SBP 25.9%vs 42.5%, MBP 24.2% vs 38.2%,p<0.05)

CONCLUSIONS

The cardioprotective effect of lipid emulsion against calcium channel blocker is **related** with **opiod receptors** and **ATP-sensitive potassium channels**.

REFERENCES

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