



Calcium Channel & Betablocker Toxicity Case Report

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CASE HISTORY

54yr/M brought with alleged h/o consumption of:

Tab. Cilnidipine (10tabx10mg)

Tab. Metoprolol(10tabx50mg)

Tab. Etiozolam(10tabx0.5mg)

Tab. Paracetamol(10tabx325mg)

Tab. Aceclofenac(10tabx100mg)

Consumption at around 10 pm on 3/2/2020

Time of presentation to ED at 3 am on 4/2/2020 symptom-free

K/C/O HTN/ANXIETY DISORDER

ON ARRIVAL AT ED:

O/E: Conscious, oriented

A: Patent

B: Spontaneous RR:20/min Spo2:100%

C: All pp felt HR:50/min (Defibrillator) BP:80/50mmHg

2 large bore iv cannula--IVF. NS 500ml bolus IV And repeat BP:90/50mmHg

D: GCS 15/15 B/I PERTL CBG:108mg/dl, Afebrile

S/E:

CVS: S1, S2 +

RS: NVBS.B/L AE+

PA: Soft, BS+

CNS: NFND

ADJUNCTS

ABG:

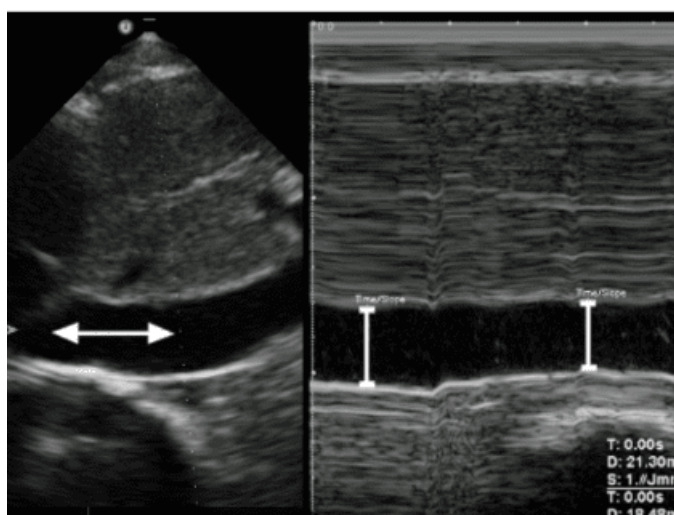
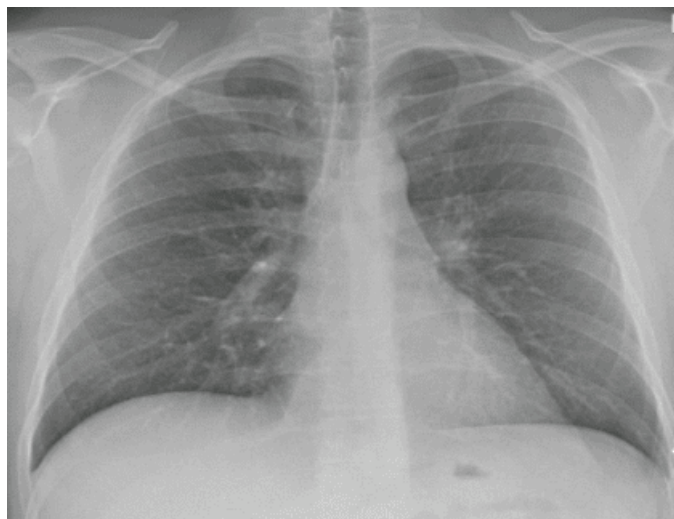
pH:7.38 pCO2:39

pO2:88 HCO3-:21 Na+:136

K+:3 Calcium:0.9 Lac:3 Creat:1

Chest XRAY: Normal

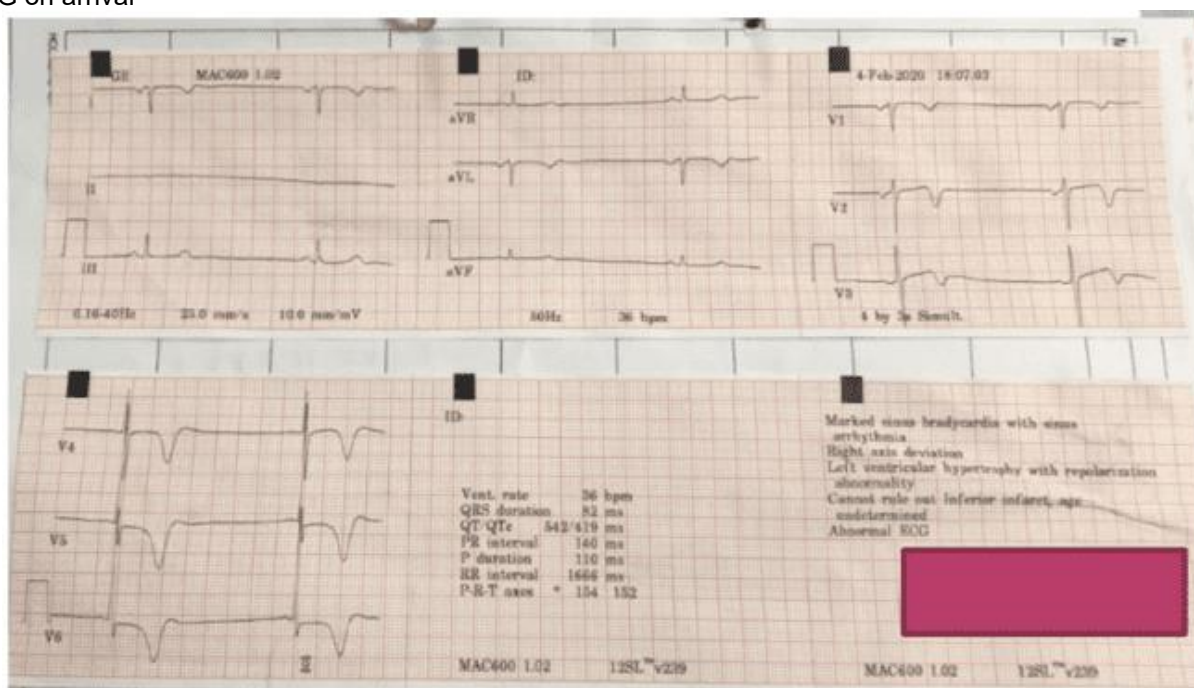
USG: IVC distended

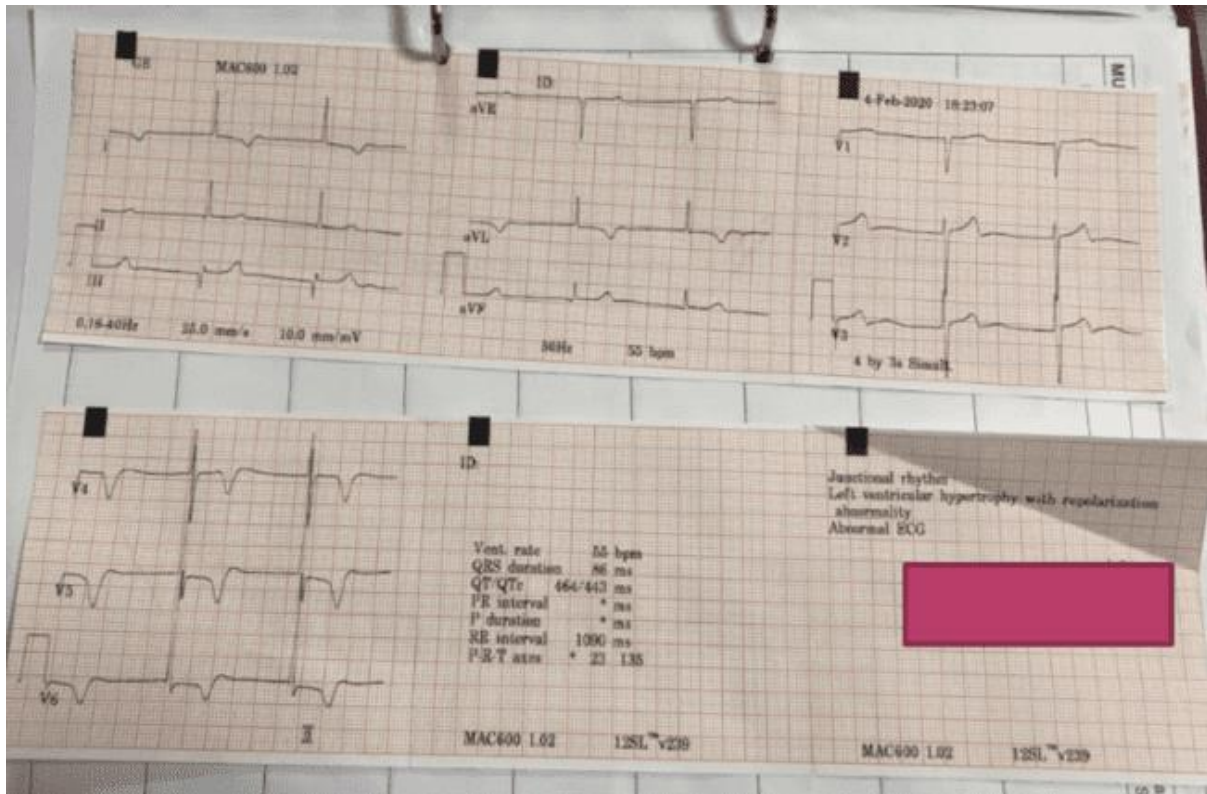


USG -IVC distended

CARDIAC EVALUATION

ECG on arrival



**ECHO:**

Normal chamber dimension, Conc. LVH Mild MR/TR with mild PAH (EPAP 34mmHg) Normal LV systolic function EF:60%. No RWMA. No clot/PE Cardiac enzymes were negative

MANAGEMENT AT ED:

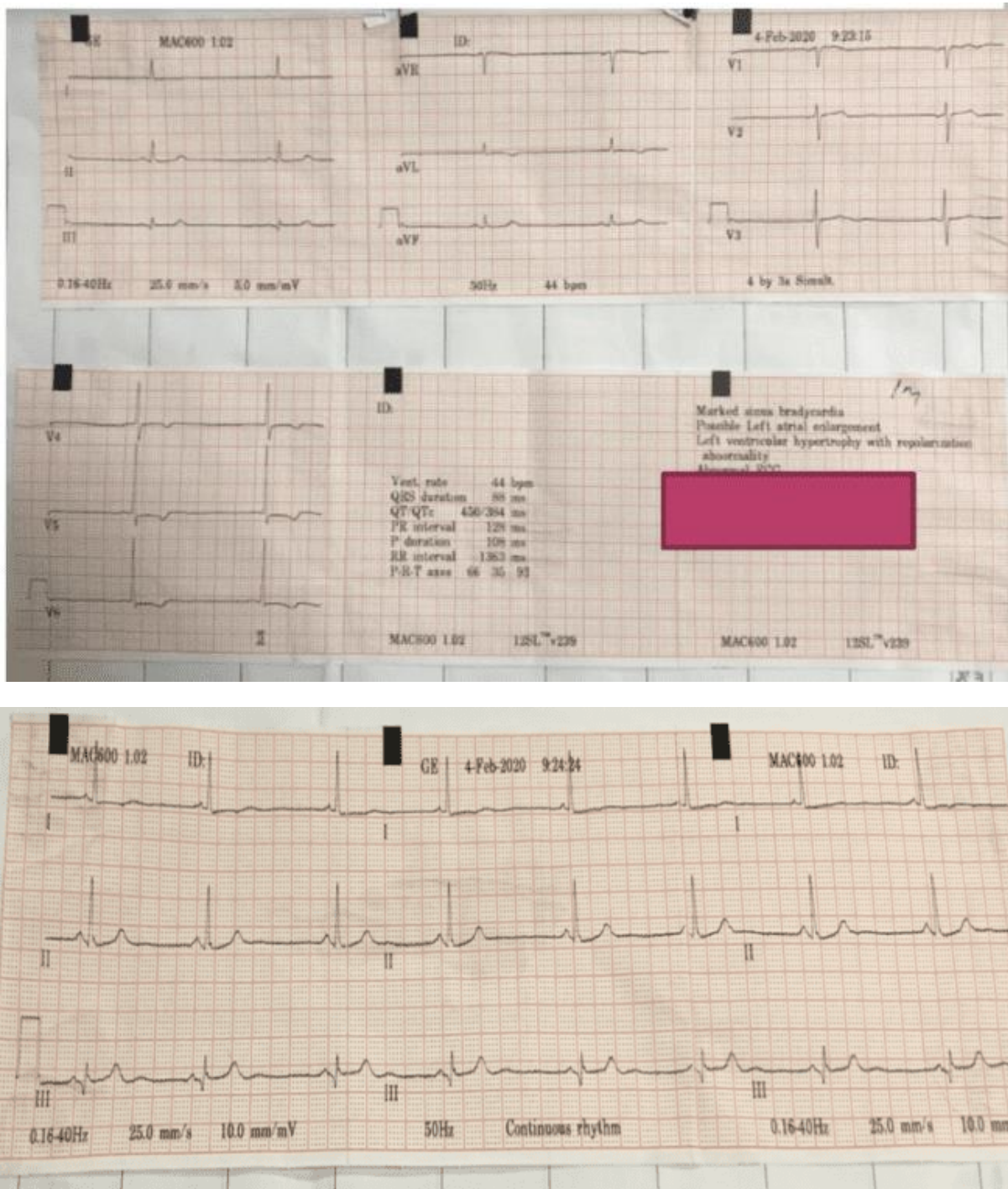
Ryle's tube & Stomach wash was given followed by the administration of Activated charcoal 50g through Ryle's tube

In view of persistent hypotension & bradycardia, the patient was started on:

- *Inj. Noradrenaline 0.2mcg/kg/min iv
- *Inj. Adrenaline 0.3mcg/kg/min iv
- *Inj. Calcium gluconate 30ml iv
- *Inj. H. Actrapid 50 units iv stat f/b 10 units/hr iv
- *IVF. 10% Dextrose 100ml/hr iv
- *Inj. KCl 40mEq in 500ml NS 100ml/hr iv
- *Inj. Glucagon 5mg iv bolus f/b 2mg/hr iv

The central line & Arterial line were placed

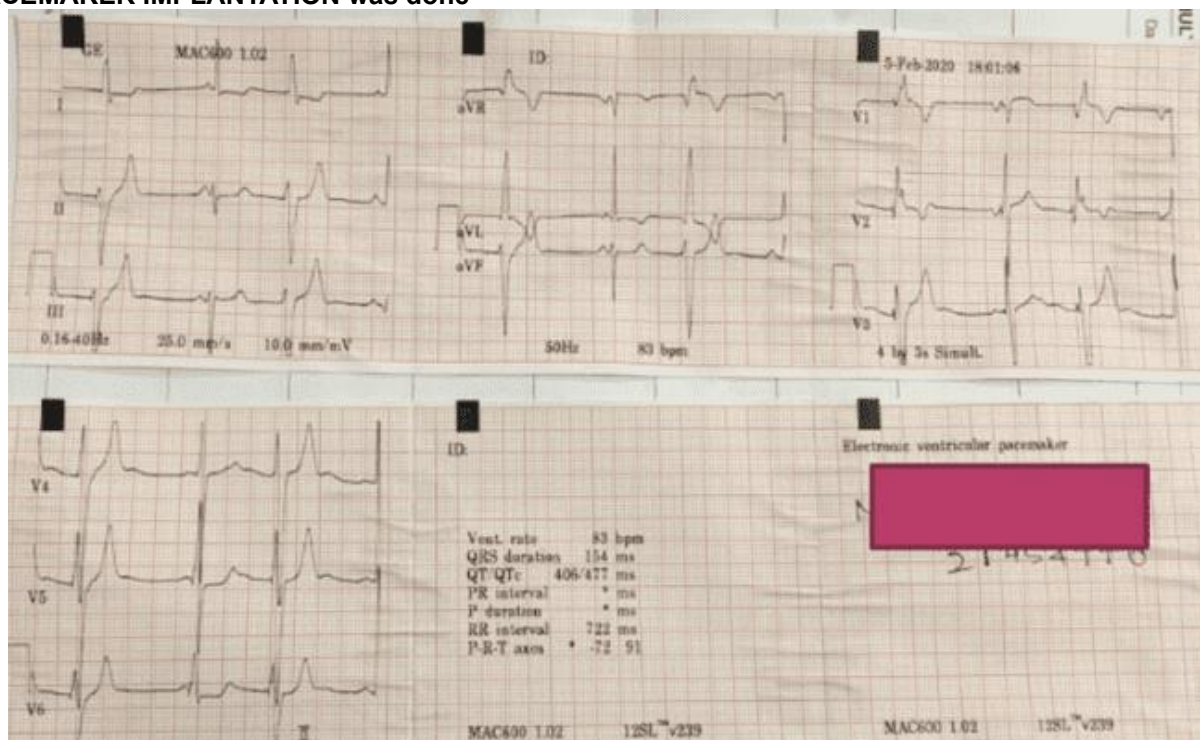
ECG prior to shifting to ICU:

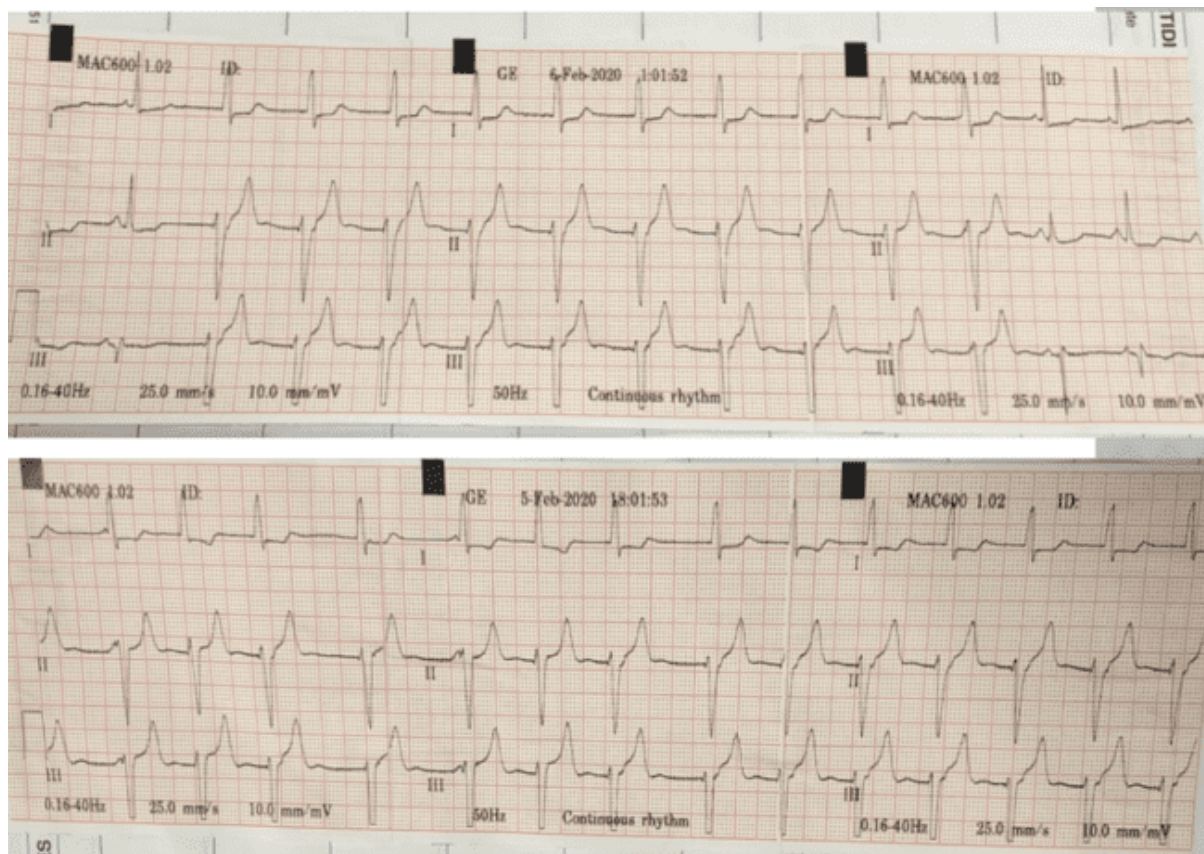


At ICU, G. Medicine/Psychiatric /Cardiology consultation obtained CBC/RFT/LFT/Sr. electrolytes within normal limits

ICU admission:

The patient was administered N acetylcysteine 150mg/kg iv in 200ml of 5%Dextrose over 1 hour □ 50mg/kg iv in 500ml of 5%Dextrose over 4 hrs □ 100mg/kg iv in 1000ml of 5%dextrose over 16 hrs Vitals stabilized and infusions were discontinued gradually except for Inj. Adrenaline 0.2mcg/kg/min iv Persistent bradycardia HR:38/min

**PACEMAKER IMPLANTATION was done**



DISCUSSION:

Beta-blockers & calcium channel blockers over-dosage:

Calcium channel blockers target L-type voltage-gated calcium channels responsible for the Depolarization of the SA node & impulse propagation through the AV node Beta-blockers antagonize beta-adrenergic receptors

Coingestion presents with hypotension & bradycardia--Cardiogenic shock

Poisoning by CCBs is characterized by cardiovascular toxicity with hypotension and conduction disturbances, including sinus bradycardia and varying degrees of atrioventricular block Refractory to resuscitation measures

TREATMENT:

-Primarily supportive, includes saline fluid resuscitation essential to correct vasodilatation & low cardiac filling pressures

-Gastric decontamination

-Inotropes/vasoconstrictors for fluid resistant hypotension

(Dopamine/Dobutamine/Adrenaline/Noradrenaline)

-**Definitive:** Pacemaker implantation in case of persistent bradycardia & varying degrees of heart block

-Calcium administration:

Recommended dose:10-20 ml of 10% calcium chloride (30-60 ml for calcium gluconate) with repeat boluses every 10-20 minutes for 3-4 additional doses

-Glucagon administration:

It activates adenylate cyclase via G proteins resulting in a positive chronotropic & inotropic effect.

Initial dose: Bolus of 5-10 mg over 1-2 minutes is an appropriate initial dose

Because of the short duration of action, an IV infusion of 2-10 mg/hour should follow the initial bolus

-Hyperinsulinemic euglycemia (HIE)

CCBs reduce insulin secretion, create tissue insulin resistance & interfere with glucose catabolism leading to lactic acidemia & metabolic acidosis. Insulin administered reverses it & has a direct positive inotropic effect

Dosing of insulin:1 Unit/kg regular insulin IV bolus followed by 1-10 U/kg/hour continuous infusion Major anticipated adverse events with high-dose insulin are *Hypoglycemia *Hypokalemia Administration of high-



dose insulin produces cardiovascular stabilization (IMPROVED CARDIAC CONTRACTILITY) & decreased the catecholamine vasopressor infusion rate, improved the survival rate

-Methylene blue:

It can counteract post-coronary artery bypass vasoplegia (low systemic vascular resistance) by inhibiting guanylate cyclase, thus decreasing cyclic guanosine monophosphate (cGMP) & inhibiting NO synthesis. It has successfully treated refractory cases of CCB overdose as an adjuvant to vasopressors and HIE therapy

-Lipid emulsion therapy:

It provides a sustained fatty acid energy source to the myocyte under a toxic metabolic milieu. An initial bolus of 1.5 ml/kg iv of 20% lipid emulsion followed by 0.25-0.5 ml/kg/min iv over 30 minutes

: Pacemaker implantation in case of persistent bradycardia & varying degrees of heart block

Reference

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