Emergencies a Series - 4

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We will discuss Ventricular fibrillation in 3 patients of which 2 cases were following different medications.

Drugs causing Ventricular Fibrillation (V-fib):

One is an anti-arrhythmic drug causing V-fib. Amiodarone is a well-known anti-arrhythmic drug. All anti-arrhythmic drugs are also pro-arrhythmic.

Another patient had gone for V-fib the offender is haloperidol a pro-arrhythmic drug.

*Role of Dopamine in Cardiac arrest.

*Induction of V-fib in an arrested patient by defibrillation.

First, we will discuss the patient in V-fib following IV amiodarone.

An 84-year-old male was admitted to the ICU for chest discomfort. Monitor lead showed an altered rhythm and the ICU staff alerted the duty physician.

It was pulseless Ventricular tachycardia (V-tac). To abort this 150mg IV amiodarone was administered.

Immediately after the injection patient was in V-fib. He was defibrillated immediately with 360 joules of DC shock.

The rhythm in the monitor changed to normal, but he was unconscious for about 10 min and then regained consciousness.

The only drug that was inflow during the 10 min was a short run of Dopamine 1 amp in 500 ml NS. This could be due to increased cerebral perfusion due to dopamine infusion.(1)

Later, the patient was referred to Dept of Cardiology in a stable state.

In the second patient, the offending drug was haloperidol.

A 37-year-old male chronic alcoholic came to the hospital around 9:45AM with chest discomfort. Chest pain was retrosternal for about 2 hours since 7:30 AM. Blood Pressure was140/80.ECG showed STEMI of the inferior wall.

Causality Medical Officer administered 5mg sublingual Sorbitrate to relieve chest pain. His Blood Pressure dropped to 80/60mm of Hg and his heart rate was around 40.

3 ampoules of atropine in a span of 10 min was administered.

An IV bolus of NS was rushed because of suspected RV infarction along with Dopamine infusion.

Since the BP raised to 160/100 mm of Hg, Dopamine was discontinued. For his chest pain Inj. Pethidine along with Inj. Phenergan was administered.

The patient had thrombolysis between 10:40 to 11:20 AM. The patient was restless and in agitation during and after thrombolysis.

2 mg of IV Inj. Midazolam could not control his restlessness. (2)

2 mg of IV Haloperidol was given and it quietened him (3), Within minutes had went for V-Fib. Immediate Defibrillation with 360J of DC shock reverted the fibrillatory rhythm to normal sinus. He was then quiet.

Regular cardiac drugs were given, and he was discharged after 5days in a stable state.

Case3:

A call was made to the duty Physician around 3:00 AM to see a patient in cardiac arrest. Before attending to the patient, a phone order of 1 ampoule of Dopamine in 500ml NS to rushed. Before the Duty Physician arrived, the patient was intubated and with chest compression reverted to sinus rhythm. He was transferred to the ICU. In the ICU he had gone for recurrent cardiac arrest.

During CPR, the monitor lead showed occasional V-tach complexes. Defibrillation induced V-fib and the patient was again defibrillated, and the rhythm reverted to normal.

A similar episode occurred again and was reverted as before.

The patient was alive till noon of that day and was referred to a Govt Medical College as he had COVID. He was in the Govt Hospital for 7 days and was discharged.

Discussion on drugs used in these cases that is Dopamine, amiodarone, haloperidol, and Benzodiazepines.

George Barger and James Ewensin 1910 discovered dopamine at welcome laboratories in London England.

Dopamine is the immediate metabolic precursor of norepinephrine/epinephrine. A part from its use as a neurotransmitter, dopamine is useful in cardiac failure and **cardiac arrest.**

In case of cardiac arrest use of Dopamine 2mg in 500ml NS as a short run or till complexes normalized. Sometimes with chest compression, only dopamine infusion reverts the arrest. The dose should be reduced to 2 to 3 Micrograms/kg/min after hemodynamics stability and then to stop. Its action could be due to augmentation of cerebral perfusion as evident in the first patient.

Dopamine at lower concentrations increases renal perfusion (2 to 3 micrograms/kg/min) at still higher concentrations (5 to 10 micrograms/kg/min) it acts as an inotrope. At 20 Micrograms or more, it causes generalized Vasoconstriction. (4)

When the chronotropic effect of epinephrine is undesirable, dopamine or dobutamine is preferred for their ionotropic effect.(5)

Clinical assessment of Myocardial function perfusion of vital organs such as the brain and the production of urine to be monitored during dopamine infusion. Reduction in urinary flow, tachycardia, or the development of arrhythmia are indications of reduced dosage or stop.

Amiodarone is the most effective drug for preventing Atrial fibrillation and complex ventricular ectopy or non-sustained Ventricular tachycardia, but there was no benefit in sudden cardiac death or total mortality. In case of ventricular fibrillation or cardiac arrest, a short run of dopamine infusion would help in cerebral perfusion and the complex in the monitor normalizes in contrast to conventional theory.(6)

Benzodiazepines can be used for the control of acute agitation Antipsychotics such as haloperidol may be useful for aggressiveness and sedation. EPS limits its use in the control of acute episodes (2) (3)

Reference

1. Opie, L. H., & Gersh, B. J. (2014). Drugs for the Heart, 2014 South Asia Edition.
2. Brunton, L. L., Hilal-Dandan, R., & Knollmann, B. C. (Eds.). (2017). Goodman & Gilman's: The Pharmacological Basis of Therapeutics (13th ed.). McGraw-Hill Education.
3. Braunwald, E., Zipes, D. P., & Libby, P. (Eds.). (2015). Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine (6th ed.).