Background
Target temperature management has been shown to alleviate post-cardiac arrest syndrome and improve survival. The cannabinoid receptor agonist WIN55, 212-2 (WIN) pharmacologically induces hypothermia (H) by resetting the hypothalamic temperature point. We previously demonstrated an improvement in myocardial and neurological function with WIN vs. traditional mechanical hypothermia. A recent clinical study demonstrated that a lower heart rate (HR) during hypothermia is associated with a better prognosis in out-of-hospital cardiac arrest patients. The effects of WIN induced H (WH) on HR compared to Mechanic Hypothermia (MH) are unknown. Therefore we hypothesized that WIN lowers HR to a greater extent than MH for the duration of H.

Methods
Animal Model
Ventricular fibrillation (VF) was induced in 18 Sprague-Dawley rats weighing between 450 and 550g. VF was untreated for 6 min followed by 8 min of CPR. Resuscitation was then attempted with defibrillation.

Experimental Protocol
After resuscitation, animals were randomized into three groups five min after resuscitation: Normothermia (N), mechanical hypothermia (MH) and WIN induced hypothermia (WH). N and H were respectively defined as 37°C and 33°C. At post-resuscitation (PR) 5 minutes, for the WH group WIN was administered and for the MH and N groups a vehicle (2% Tween-80 in 0.9% NaCl) solution was administered, both at (1.4 ml/kg/h) for 4 hours. H in the MH group was produced with ice packs. Blood temperatures and ECG were monitored continuously. Heart rate and myocardial performance index (MPI) were measured at baseline, PR 60 min, PR 120 min, PR 180 min and PR 240 min.

Results
Our results illustrate that heart rate in the WH group was significantly lower than in the MH group at all time points from PR 60 min to PR 240 min although the blood temperatures in both groups were similar. The WH group had a significantly lower MPI compared to the MH group (Figure 1).

Conclusions
The significantly lower heart rate following WIN55, 212-2 induced hypothermia is associated with improved post resuscitation systolic and diastolic myocardial function.

References

Disclosure
None