Introduction:
The circadian clock influences a number of cardiovascular physiological processes. A time-of-day variation in infarct size has recently been shown in patients with ST segment elevation myocardial infarction. However, there is no clinical evidence of circadian variation in patients with out-of-hospital cardiac arrest (OHCA) of cardiac etiology.

Methods:
We performed retrospective analysis using data from Japan’s nationwide OHCA registry from January 2005 through December 2012, which includes all OHCA patients presented with ventricular fibrillation as first documented rhythm, and consequently confirmed cardiac etiology. In order to eliminate the night and weekend effects, we enrolled only patients suffered OHCA in the morning (6:00-11:59) or afternoon (12:00-17:59) on weekdays. We determined the impact of time-of-day onset of OHCA on clinical outcomes including return of spontaneous circulation (ROSC), survival and favorable functional status at 1 month after cardiac arrest.

Results:
Of 13474 eligible patients, 7199 suffered OHCA in the morning and 6275 in the afternoon. The rate of ROSC was higher in the afternoon group than in the morning group (37.2% vs. 35.0%, adjusted odds ratio 1.08, 95%CI 1.01-1.17, p=0.036), however, the rate of survival and favorable functional status at 1 month were not significantly different among both groups (36.7% vs. 36.1%, 25.5% vs. 26.2%, respectively). In the propensity-matched cohort consisted of 6103 patients each from both groups, the rate of ROSC was higher in the afternoon group (37.1% vs. 35.3%, adjusted odds ratio 1.10, 95%CI 1.01-1.18, p=0.023) and there were no significant differences in the rate of survival and favorable functional status at 1 month (36.6% vs. 36.6%, 25.5% vs. 26.6%, respectively).

Conclusion:
We found an independent correlation between the time of the day at which OHCA occurred and ROSC, however, this did not impact long-term outcomes.