An observational study of vasopressin in a cardiac PICU

Sajini Ramakrishnan, Sanjiv Nichani
Cardiac PICU, Leicester Children's Hospital

AIMS

1. **Primary outcome : To determine whether vasopressin improves hemodynamic parameters of children admitted into a cardiac PICU.**
2. **Secondary outcomes :**
   - **a. Association between vasopressin infusion and length of ICU stay**
   - **b. Adverse effect profile of vasopressin infusion .**
   - **c. Compare 30 day survival of vasopressin cohort with the NCHDA data**

Null hypothesiss: There is no difference in hemodynamic parameters before and after initiaion of vasopressin infusion.

MATERIALS AND METHODS

Retrospective, data collection from case notes for the period starting from July 2016 till July 2021.

Parameters: age, weight, diagnosis, systolic blood pressure, mean BP and diastolic blood pressure before initiation of vasopressin infusion and at the end of first 24 hours of vasopressin infusion, vasoactive inotropic scores before, at the end of first 24 and 48 hours of vasopressin infusion, number of days on vasopressin infusion, length of ICU stay, 30 day mortality and adverse effects recorded while receiving the infusion .

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DATA ANALYSIS

Descriptive statistics used for demographic variables and for determining the proportion of post cardiac procedure children.

Blood pressures and vasoactive inotropic scores before and after vasopressin infusion were analysed using paired t test for two sample means. Multiple regression analysis used to ascertain how the number of days vasopressin infusion influence the length of ICU stay.

30 day mortality was categorized per procedure similar to National Congenital heart disease audit and compared .

RESULTS

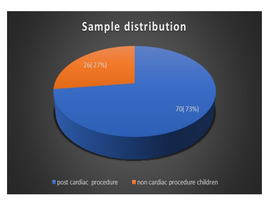
Total children studied : 96

Mean age 9.36 months

Mean weight 6.42kg

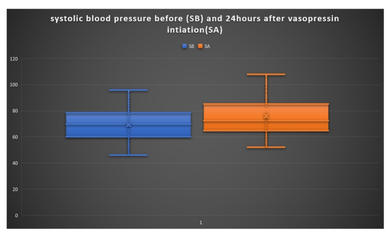
73% -post cardiac procedure

27%- non cardiac procedures *(Fig 1)*



There is a statistically significant increment in systolic bp (p value 0.0000007) with vasopressin infusion *(Fig2)*

Figure 2



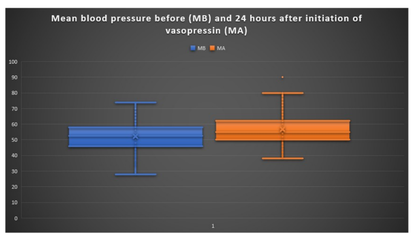


Figure 3

The mean blood pressure (p vlaue 0.0021) improved significantly *(Fig 3)*

Also the diastolic bp showed improvement (p value 0.00035) with vasopressin. *(Fig 4)*

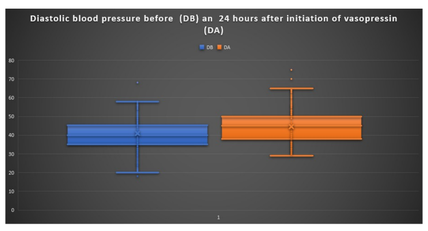


Figure 4

There is no significant decrease in vasoactive inotropic score at the end of first 24 hours of vasopressin infusion. However VIS reduced significantly at the end of 48hrs of vasopressin infusion. (p value 0.000006) *(Fig 5)*

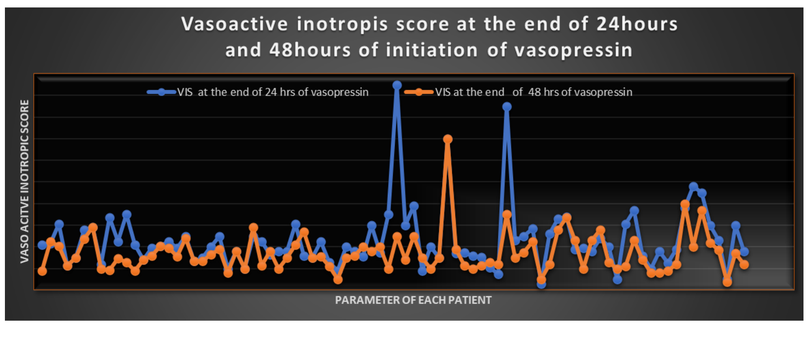


Figure 5

Average days spent on vasopressin infusion :3 days

For each day of receiving vasopressin infusion, there is an increase in ICU of stay between 3.2 and 6.7 day (p value 0.000008) (*Fig 6*)

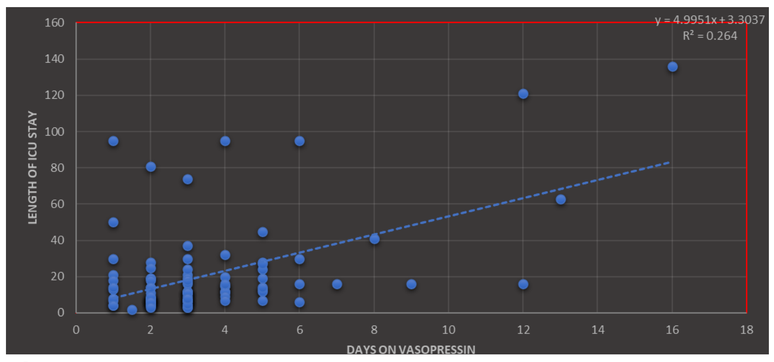


Figure 6

As the data collection period is similar to the timeline used in National Congenital heart disease audit published in October 2021, 30 day mortality is compared to the audit, after categorising children as per procedure in reference to the audit. More patient numbers are needed for comparing Norwood , Glenn and Rashkind atrial septostomy.

30 day mortality in vasopressin cohort is comparable to the national average. *(Fig 7)*

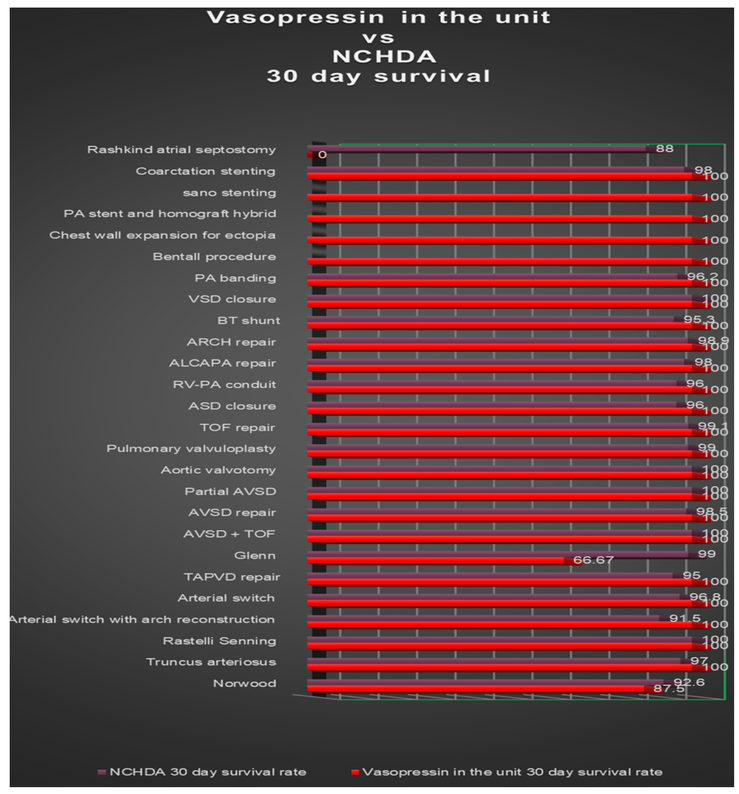


Figure 7

No increase in incidences of necrotizing enterocolitis, hyponatremia, thrombophlebitis, skin necrosis or oliguria in vasopressin cohort.

DISCUSSION

Vasopressin improves blood pressure and reduces vasoactive inotropic score at the end of 48 hours, hence rejecting null hypothesis. Vasopressin being largely used in sicker children ,makes it difficult to determine whether increase in length of ICU stay is contributed by the infusion. Comparison with the national average shows that vasopressin does not reduce 30 day mortality in post cardiac surgery children. There is no increase in adverse effects noticed in this retrospective study.

CONCLUSION

Vaopressin is a safe vasoactive agent improving hemodynamic profiles but has not been shown to be reducing either the length of stay in ICU or mortality.

LIMITATIONS

This is a retrospective study and is based on the case records. There is no matched control group for this study. A randmoszed controlled multicentre trial is needed for more quality of evidence .

References:

1. Raghavan VR, Cruz EM, Kaufman J, Lujan SO. International Survey on the Use of Arginine Vasopressin in the Postoperative Management of Single Ventricle Patients. 2021;9(July):1–8.
2. Cardiac N, Programme A. NATIONAL CONGENITAL HEART DISEASE AUDIT (NCHDA). 2021;