

Evaluation of ACE/ARB/ARNI in Patients with Heart Failure on Hemodialysis

Purpose

The purpose of this study was to observe if patients who had scheduled hemodialysis sessions were receiving optimal inpatient drug therapy for their heart failure. The primary objective of the study was observing how many patients with heart failure and hemodialysis received an angiotensin converting enzyme inhibitor, angiotensin receptor blocker, and angiotensin receptor/neprylisin inhibitor (ACE, ARB, ARNI). Secondary objectives include comparing incidences of hypotension, hyperkalemia, and hospital readmissions.

Methods

This was an Institutional Review Board-approved retrospective single-center study conducted at a 500-bed hospital in Springfield, Illinois. Eligible patients had a cardiovascular-related admission, hospitalized for at least 48 hours between October 2018 to October 2022, ages between 40-89, history or new diagnosis of heart failure, and on scheduled hemodialysis. Patients excluded included individuals on hospice or end-of-life care. Patients' data between admission and hospital day seven were reviewed for demographics, past medical history including heart failure with reduced, mildly reduced, and preserved ejection fraction (HFrEF HFmrEF, HFpEF), duration of hospitalization, labs, vitals, and blood pressure lowering medications received. Hyperkalemia was defined as potassium greater than 5.5 mEq/L, hypotension was defined as <100/60 mmHg, and readmissions were observed as either within 30 days and/or between 30-90 days after discharge. Descriptive statistics were used to evaluate the data.

Results

A total of 100 patients were reviewed, of which, 56% were female. 82 patients were Caucasian and 17 were African American. When classifying heart failure, 34 patients had HFrEF, of which, 17 received either an ACE/ARB/ARNI with only 6% being given target doses, 59 had HFpEF, of which, 12 had an ACE or ARB, and 7 had HFmrEF, of which, 2 were on an ACE or ARB. For the patients that received an ACE (n=15) vs patients that received an ARB (n=13) vs patients that received an ARNI (n=3), 10(67%) vs 5(38%) vs 3(100%) experienced hypotension, 3(20%) vs 5(38%) vs 1(33%) experienced hyperkalemia, 2(13%) vs 7(54%) vs 0(0%) were readmitted within 30 day, and 5(33%) vs 7(54%) vs 2(67%) were readmitted between 30 and 90 days, respectively. Overall, for the ACE/ARB/ARNI group (n=31) vs no ACE/ARB/ARNI group (n=69), 28(90%) vs 54(78%) were on a beta blocker, 10(32%) vs 26(38%) were on a loop diuretic, 18(58%) vs 47(68%) experienced hypotension, 9(29%) vs 17(25%) experienced hyperkalemia, 9(29%) vs 21(30%) were readmitted within 30 days, and 14(45%) vs 21(30%) were readmitted between 30 and 90 days, respectively

Conclusion

From our study population, few patients received either an ACE/ARB/ARNI in the hospital and even fewer received target doses of these medications which were likely due to issues of tolerability in patients receiving dialysis. When comparing our ACE/ARB/ARNI against each other, all patients who received ARNIs experienced hypotension and an ACE inhibitor was better than an ARB in terms of hyperkalemia and both timeframes of readmission. Our ACE/ARB/ARNI group had a greater number of patients on a beta blocker than the group that did not receive an ACE/ARB/ARNI but performed slightly worse or similar in all secondary objectives, except hypotension. In conclusion, ACE inhibitors may be the preferred option between ACE/ARB/ARNI for patients with HF and dialysis due to lower incidences of adverse events, however, the data comparing ACE/ARB/ARNI vs no ACE/ARB/ARNI did not show significant benefit in most outcomes to promote ordering inpatient. A greater sample of patients in the future should be utilized to acquire more accurate data.