| Table J-8. Studies evaluating independent predictive value of BNP for the outcome of morbidity |
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| **Author****Year** | **Study Design****Population** | **n****Mean Age (SD)****% male** | **BNP Levels (pg/mL)** | **Prognostic Markers** | **Followup****Outcomes****(#events, #risk)** | **Model** | **Adjusted/Non-adjusted Covariates** | **Measure(s) of Risk****(95% CI,)** |
| Singer172009 | RCTPatients presenting to ED with signs and symptoms of HF | n=472mean age:64y (NR)51% male | ADM Mean: Experimental=1,189Control=1,096D/C mean: NRCutpoint: NR | Serial BNP testing, age, gender, BUN, creatinine, systolic BP, heart rate | 30dICU ADM(NR) | Multivariable logistic regression | Age, gender, BUN, creatinine, systolic BP, HR | Knowledge of ADM and serial testing vs. control: ADM: OR=0.7 (0.2-2.1) |
| Serial BNP testing, age, gender, BUN, creatinine, systolic BP, heart rate | 30dHF reADM(NR) |  Multivariable logistic regression | age, gender, BUN, creatinine, systolic BP, HR | Knowledge of ADM and serial testing vs. control: OR=0.8 (0.5-1.3) |
| Allen342011EVEREST Study | Case seriesSecondary analysis of RCT dataPatients hospitalized with HF (BNP 500-999 vs. BNP <500) | n=1,047mean age:NR% male: NR | ADM mean: NRD/C mean: NRCutpoint: NR | BNP, age >70y, diabetes, history of stroke, arrhythmia, BB, BUN, hyponatremia, hypernatremia, KCCQ | 24wUnfavorable QoL(NR) | Modified poisson regression | Age >70y, diabetes, history of stroke, arrhythmia, BB, BUN, hyponatremia, hypernatremia, KCCQ | D/C: RR=1.15 (0.81, 1.62) |
| Case seriesPatients hospitalized with HF (BNP 1,000+ vs. BNP <500) | n=1,112mean age:NR% male: NR | ADM mean: NRD/C mean: NRCutpoint: NR | BNP, age >70y, diabetes, history of stroke, arrhythmia, BB, BUN, hyponatremia, hypernatremia, KCCQ | 24wUnfavorable QoL(NR) | Modified poisson regression | Age >70y, diabetes, history of stroke, arrhythmia, BB, BUN, hyponatremia, hypernatremia, KCCQ | D/C: RR=1.22 (0.85, 1.75) |
| Allen2011EVEREST Study(cont’d) | Case seriesPatients hospitalized with HF (BNP 500-999 vs. BNP <500) | n=1,047mean age:NR% male: NR | ADM mean: NRD/C mean: NRCutpoint: NR | BNP, age >70y, diabetes, history of stroke, arrhythmia, BB, BUN, hyponatremia, hypernatremia, KCCQ | 24wRehospitalization(NR) | Multivariable cox regression  | Age >70y, diabetes, history of stroke, arrhythmia, BB, BUN, hyponatremia, hypernatremia, KCCQ | D/C: HR=1.51 (1.18, 1.93) |
| Case seriesPatients hospitalized with HF (BNP 1,000+ vs. BNP <500) | n=1,112mean age:NR% male: NR | ADM mean: NRD/C mean: NRCutpoint: NR | BNP, age >70y, diabetes, history of stroke, arrhythmia, BB, BUN, hyponatremia, hypernatremia, KCCQ | 24wRehospitalization(NR) | Multivariable cox regression  | Age >70y, diabetes, history of stroke, arrhythmia, BB, BUN, hyponatremia, hypernatremia, KCCQ | D/C: HR=1.70 (1.34, 2.15) |

| Table J-8. Studies evaluating independent predictive value of BNP for the outcome of morbidity (continued) |
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| **Author****Year** | **Study Design****Population** | **n****Mean Age (SD)****% male** | **BNP Levels (pg/mL)** | **Prognostic Markers** | **Followup****Outcomes****(#events, #risk)** | **Model** | **Adjusted/Non-adjusted Covariates** | **Measure(s) of Risk****(95% CI,)** |
| Neuhold382010 | CohortPatients with chronic systolic HF  | n=181mean age:70y (12)65% male | ADM mean:658.14D/C mean:460.54Cutpoint: NR | BNP D/C, copeptin, MR-proADM, MR-proANP, CT-proET-1  | 24mRehospitalization for worsening HF(72, 181) | Multivariable cox regression  | Age, gender, GFR, diabetes, ischemic etiology of HF | D/C: HR=NR, p=NS |
| Stoiser42006 | CohortPatients diagnosed with chronic HF admitted to hospital | n=268mean age:71y (13)67% male  | ADM mean:699 (811)D/C mean: NRCutpoint: 448 | BNP at D/C, copeptin, age, history of diabetes, HT, CAD, kidney dysfunction, gender | 24mChronic HF reADM(122, 268) | Multivariate cox regression  | Age, history of diabetes, HT, CAD, kidney dysfunction\*, gender | D/C: chi-square 18, p=0.0001 |

**Abbreviations:** ADM = admission; BB = betablocker; BNP = B-type natriuretic peptide; BP = blood pressure; BUN=blood urea nitrogen; CAD = coronary artery disease; 95% CI, = confidence interval; CT-proET-1 = C-terminal pro-endothelian-1 precursor fragment; CV = cardiovascular; d = day(s); D/C = discharge; ED = emergency department; EVEREST = Efficacy of Vasopressin Antagonism in HF Outcome Study with Tolvaptan; HF = heart failure; HR = hazard ratio; hs-CRP = high-sensitivity c-reactive protein; HT = hypertension; ICU = intensive care unit; KCCQ = Kansas City Cardiomyopathy Questionnaire; m = month(s); MR-proADM = midregional pro-adrenomedullin; MR-proANP = midregional pro-atrial natriuretic peptide; n=number; NR = not reported; NS = non-significant; NT-proBNP = N-terminal pro-B-type natriuretic peptide; NYHA = New York Heart Association; OR = odds ratio; pg/mL = picograms per milliliter; QoL = quality of life; RR = relative risk; SD = standard deviation; vs. = versus; w = week(s); y = year(s)