| Table J-5. Studies evaluating independent predictive value of BNP for the outcome of all-cause mortality (12 to 23 months) |
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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,)** |
| Arenja372011BASEL | CohortPatients with acute HF  | n=377mean age:79y (72 - 84)\*\*53% male | ADM mean: 848(471–639)D/C mean: NRCutpoint: per 100 pg/mL | BNP, NYHA, BMI, age, cTnI, HT, DM, smoking, CAD, previous MI, creatinine | 12mAll-cause mortality(130, 377) | Multivariable cox regression | NYHA, BMI, age, cTnI, HT, DM, smoking, CAD, previous MI, creatinine | ADM: HR=1.01 (1.00, 1.05) per 100 pg/mL, p=0.02 |
| Reichlin132010BASEL | CohortPatients presenting to the ED with acute dyspnea and acute HF | n=377mean age:79y (72-84)\*\*53% male  | ADM mean:847\*\*D/C mean: NRCutpoint: >847 | BNP, MPO, age, sex, BMI, HT, DM, smoking, CAD, history of MI and HF, NYHA class | 12mAll-cause mortality(130, 377) | Multivariable cox regression | CV risk factors (age, sex, BMI, HT, DM, smoking, CAD, history of MI and HF), NYHA class | ADM: HR=1.65 (1.15-2.37) |
| Dieplinger,272009Mueller et al, 2005;Gegenhuber et al, 2006 | CohortPatients consulting the ED with acute HF | n=137mean age:survivors= 75y (65,80)\*\*deceased= 79y (72-83)\*\*93% male  | ADM mean: NRD/C mean: NRCutpoint: >1,250  | BNP, adiponectin, CRP, renal dysfunction | 12mAll-cause mortality(41, 137) | Multivariable cox regression  | Adiponectin, age, systolic BP, renal dysfunction, systolic dysfunction, NYHA class III/IV, arterial hypertension, CAD, smoking, BMI, CRP | ADM: RR=2.45 (1.29-4.65) |
| Gegenhuber72007Mueller et al, 2005;Gegenhuber et al, 2006 | CohortPatients consulting the ED with acute HF | n=137mean age:alive= 75y (65,80)\*\*dead= 79y (72-83)\*\*93% male  | ADM mean: alive=668\*\*dead=1,461\*\*D/C mean: NRCutpoint: >1,250 | BNP, advanced age, low systolic BP, renal dysfunction, systolic dysfunction, NYHA III/IV | 12mAll-cause mortality(41, 137) | Multivariable cox regression | Advanced age, low systolic BP, renal dysfunction, systolic dysfunction, NYHA III/IV | ADM: HR=3.34 (1.61 - 6.97) |
| Rehman432008PRIDE | Cohort346 patients with acute HF | n=346mean age:73y (13)68% male | ADM Mean:494 (203, 1,180)\*\*D/C Mean: NRCutpoint: >494 | BNP, ST2, CRP, BNP, age, prior CHF, BB, ACE inhibitor, NYHA, systolic BP, creatinine | 12mMortality(97, 346) | Multivariable cox regression  | ST2, CRP, NT-proBNP, age, prior HF, BB, ACE inhibitor, NYHA, BP, BMI, S3 gallop, rates on lung exam, creatinine, BUN, WCC, Hb, pleural effusion | ADM: HR=2.12 (1.37-3.27),  |

| Table J-5. Studies evaluating independent predictive value of BNP for the outcome of all-cause mortality (12 to 23 months) (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,)** |
| Sakhuja392007PRIDE | CohortPatients with acute HF presenting to urban academic center | n=209mean age:increased cTnT= 74.3y (11.6)no increased cTnT= 71.4y (14.9)52% male | ADM mean: increase cTnT = 544\*\*no-increase CTnT= 221\*\*D/C mean: NRCutpoint: 352 | BNP, cTnT, age, GFR, NYHA class | 12mAll-cause mortality(NR) | Multivariable cox regression  | cTnT, age, GFR, NYHA class | ADM: HR=2.53 (1.53-6.21) |
| Dunlay162009 | CohortHF patients | n=593mean age:76.4y (NR)48% male  | ADM mean:350 (174-647)\*\*D/C mean: NRCutpoint: 350 | BNP>350, age, BMI, creatinine clearance, NYHA III/IV, serum Na, systolic BP, CRP, cTnT | 12mAll-cause mortality(122,593) | Multivariable logistic regression | Age, BMI, creatinine clearance, NYHA, serum Na<135mmol/L, systolic BP | ADM: HR=1.29 (1.03-1.62) |
| Noveanu422011 | CohortPatients with acute decompensated HF presenting at ED | n=171mean age:80y (73-85)\*\*60% male | ADM mean:1,315 (759, 2,349)\*\*D/C mean: NRCutpoint: NR | BNP at 24h, age, cTn, eGFR, NYHA | 12mAll-cause mortality(60, 171) | Multivariable cox regression  | age, cTn, eGFR, NYHA | 24 hours: HR=1.02 (1.01-1.04) per 100 pg/mL increase, p = 0.013 |
| BNP at 48h, age, cTn, eGFR, NYHA | 12mAll-cause mortality(60, 171) | Multivariable cox regression  | age, cTn, eGFR, NYHA | 48 hours HR=1.03 (1.01-1.06) per 100 pg/mL increase, p=0.002 |
| BNP D/C, age, cTn, eGFR, NYHA | 12mAll-cause mortality (60, 171) | Multivariable cox regression  | age, cTn, eGFR, NYHA | D/C: HR=1.02 (1.01-1.03) per 100 pg/mL increase, p<0.001 |
| Coyne352011COACH Study | Case seriesSecondary analysis of RCTPatients in hospital for symptomatic HF | n=706mean age:70.7y (11.5)61.8% male | ADM mean:674 (720)D/C mean: NRCutpoint: NR | BNP at D/C, CES-D, type D | 18mAll-cause mortality(192, 706) | Multivariable cox proportional hazard regression | CES-D, type D | D/C: HR=1.588 (1.391-1.812) |

**Abbreviations:** ACE = angiotensin converting enzyme; ADM = admission; BASEL = B-type Natriuretic Peptide for Acute Shortness of Breath Evaluation; BB = betablocker; BMI = body mass index; BNP = B-type natriuretic peptide; BP = blood pressure; BUN=blood urea nitrogen; CAD = coronary artery disease; CES-D = Center for Epidemiologic Studies Depression; 95% CI, = confidence interval; COACH = Coordinating study evaluating Outcomes of Advising and Counselling in Heart failure; CRP = C-reactive protein; cTnI = cardiac troponin I; cTnT = cardiac troponin T; CV = cardiovascular; d = day(s); D/C = discharge; DM = diabetes mellitus; eGFR = estimated glomerular filtration rate; GFR = glomerular filtration rate; h = hour(s); Hb = hemoglobin; HF = heart failure; HR = hazard ratio; HT = hypertension; m = month(s); mmol/L = millimoles per liter; MI = myocardial infarction; MPO = myeloperoxidase; n=number; Na = sodium; NR = not reported; NT-proBNP = N-terminal pro-B-type natriuretic peptide; NYHA = New York Heart Association; pg/mL = picograms per milliliter; PRIDE = Pro-BNP Investigation of Dyspnea in the Emergency Department; RR = relative risk; SD = standard deviation; w = week(s); WCC = white cell count; y = year(s)