

Supplemental Table 1: Changes of echocardiographic parameters during hospitalization in patients with AHF and non-cardiac dyspnea:

	AHF				Non-cardiac dyspnea				Difference in percent change between groups
	n	admission	discharge	p	n	admission	discharge	p	p
Cardiac geometry									
LVEDD (mm)	30	57 [50-67]	56 [48-65]	0.48	12	48 [42-53]	47 [44-55]	0.15	0.08
LVEDSD (mm)	30	43 [33-57]	41 [30-53]	0.34	12	30 [25-37]	30 [25-43]	0.15	0.06
LVEDV (ml)	29	120 [76-140]	118 [95-176]	0.23	15	96 [71-114]	91 [73-104]	0.70	0.14
LVESV (ml)	26	68 [42-108]	61 [37-124]	0.63	15	40 [32-48]	38 [29-41]	0.15	0.52
Left atrial area (cm ²)	38	25 [21-28]	25 [20-32]	0.77	15	18 [14-22]	20 [18-21]	0.67	0.64
Right atrial area (cm ²)	19	18 [16-22]	17 [16-23]	0.36	7	16 [13-17]	13 [12-16]	0.74	0.31
Cardiac function									
LVEF (%)	41	40 [29-50]	40 [30-56]	0.72	17	60 [52-64]	58 [52-61]	0.83	0.95
Heart rate (bpm)	38	89 [78-100]	74 [64-95]	0.001	15	90 [79-100]	76 [71-88]	0.16	0.99
Stroke volume (mL)	27	41 [30-58]	48 [36-59]	0.44	16	55 [38-66]	50 [37-65]	0.98	0.51
Cardiac index (mL/min/m ²)	19	2.1 [1.6-2.6]	1.9 [1.4-2.4]	0.55	13	2.6 [2.1-3.2]	2.0 [1.9-2.7]	0.22	0.72
TAPSE (mm)	21	16 [15-19]	19 [17-21]	0.04	7	20 [19-23]	18 [17-19]	0.18	0.04
E wave (cm/s)	42	95 [75-122]	85 [70-111]	0.10	18	81 [56-93]	79 [55-99]	0.98	0.32
E wave deceleration time (ms)	41	129 [105-156]	166 [128-203]	0.003	18	172 [152-238]	213 [140-264]	0.19	0.41
A wave (cm/s)	24	63 [30-92]	69 [41-89]	0.60	14	96 [62-115]	85 [70-109]	0.89	0.90
E/A	22	1.70 [0.90-2.61]	1.37 [1.12-2.39]	0.83	12	0.75 [0.63-1.17]	0.84 [0.60-1.04]	0.75	0.56
Medial e'	34	4 [3-5]	5 [4-7]	0.003	18	6 [5-7]	7 [5-8]	0.94	0.03
Lateral e'	39	7 [5-8]	7 [5-8]	0.71	18	8 [6-11]	7 [6-9]	0.10	0.43
Medial E/e'	42	21.1 [15.8-29.6]	16.6 [11.7-24.3]	0.004	21	11.5 [8.8-16.0]	11.9 [11.0-15.0]	0.34	0.003

Lateral E/e'	48	14.3 [11.4-18.4]	13.7 [9.2-18.2]	0.98	23	9.2 [7.0-10.8]	9.8 [8.2-12.6]	0.05	0.12
Mean E/e'	39	18.7 [13.7-23.9]	17.4 [10.7-20.9]	0.05	20	10.4 [7.9-13.1]	10.9 [9.5-13.3]	0.09	0.01
Parameters of venous congestion									
IVC rest diameter (mm)	23	22 [16-24]	13 [11-18]	0.009	13	18 [11-20]	16 [11-20]	0.58	0.10
IVC sniff diameter (mm)	21	16 [9-22]	7 [4-11]	0.002	12	6 [5-14]	6 [0-13]	0.39	0.38
Respiratory variability of IVC diameter (%)	21	32 [8-44]	43 [29-70]	0.04	12	55 [39-62]	52 [38-100]	0.42	0.43

Data are presented as median [interquartile range].

AHF: acute heart failure, IVC: inferior vena cava, LVEDD: left ventricular end-diastolic diameter, LVEDV: left ventricular end-diastolic

5 volume, LVEF: left ventricular ejection fraction, LVESD: left ventricular end-systolic diameter, LVESV: left ventricular end-systolic volume,

TAPSE: tricuspid annular plane systolic excursion.

Supplemental Table 2: Changes of echocardiographic parameters during hospitalization in patients with acute HFPEF (LVEF \geq 50%) and HFREF (LVEF $<$ 40%):

	HFPEF (LVEF \geq 50%)				HFREF (LVEF $<$ 40%)				Difference in percent change between groups
	n	admission	discharge	p	n	admission	discharge	p	p
Cardiac geometry									
LVEDD (mm)	10	49 [43-55]	48 [42-57]	0.96	14	68 [61-72]	66 [61-71]	0.21	0.59
LVEDSD (mm)	10	33 [25-43]	31 [28-40]	0.78	14	56 [48-61]	55 [44-59]	0.16	0.47
LVEDV (ml)	9	69 [67-100]	108 [68-118]	0.09	15	138 [131-173]	171 [147-183]	0.51	0.60
LVESV (ml)	8	37 [28-47]	60 [50-62]	0.48	13	108 [78-126]	124 [75-147]	0.62	0.50
Left atrial area (cm ²)	14	21 [16-25]	24 [19-27]	0.27	15	27 [25-34]	29 [24-34]	0.98	0.29
Right atrial area (cm ²)	4	17 [12-19]	17 [16-18]	0.27	11	18 [17-23]	22 [17-27]	0.48	0.66
Cardiac function									
LVEF (%)	13	60 [50-64]	58 [56-64]	0.60	18	30 [25-36]	29 [23-32]	0.24	0.23
Heart rate (bpm)	13	81 [80-95]	80 [72-96]	0.33	16	96 [88-110]	75 [62-95]	0.01	0.29
Stroke volume (mL)	8	34 [29-42]	52 [34-72]	0.07	13	52 [36-61]	45 [35-58]	0.75	0.24
Cardiac index (mL/min/m ²)	6	1.6 [1.4-1.6]	2.1 [1.3-3.7]	0.35	9	2.5 [2.1-3.3]	1.9 [1.4-2.4]	0.21	0.09
TAPSE (mm)	7	17 [16-22]	17 [17-19]	1.00	10	16 [15-18]	19 [18-25]	0.06	0.36
E wave (cm/s)	14	102 [85-111]	83 [73-119]	0.32	18	91 [70-131]	89 [74-111]	0.83	0.38
E wave deceleration time (ms)	13	155 [138-175]	180 [128-226]	0.46	19	121 [102-139]	159 [127-179]	0.008	0.29
A wave (cm/s)	8	92 [64-122]	79 [48-135]	0.33	11	31 [25-62]	46 [32-67]	0.35	0.13
E/A	7	1.15 [0.74-1.61]	1.36 [1.02-1.94]	0.23	10	2.15 [1.50-2.81]	2.17 [1.26-2.69]	0.33	0.13

Medial e'	13	4 [4-6]	5 [4-7]	0.16	12	4 [3-4]	5 [4-6]	0.007	0.41
Lateral e'	13	7 [6-9]	6 [4-8]	0.19	17	7 [5-8]	8 [5-11]	0.53	0.43
Medial E/e'	16	25.0 [17.4-35.4]	15.2 [11.0-24.8]	0.02	17	21.0 [14.0-25.5]	19.2 [12.0-22.0]	0.20	0.26
Lateral E/e'	17	15.8 [13.8-18.1]	16.4 [9.4-20.5]	0.49	22	13.0 [8.8-16.0]	13.4 [8.8-19.0]	0.71	0.79
Mean E/e'	15	19.8 [16.1-30.1]	18.0 [11.3-20.9]	0.31	16	18.0 [11.3-21.5]	18.0 [10.6-23.5]	0.44	0.68
Parameters of venous congestion									
IVC rest diameter (mm)	6	22 [16-23]	18 [17-22]	0.67	12	22 [18-25]	14 [12-20]	0.04	0.39
IVC sniff diameter (mm)	6	11 [9-22]	11 [6-13]	0.35	10	19 [10-24]	7 [0-13]	0.03	0.31
Respiratory variability of IVC diameter (%)	6	42 [14-45]	40 [29-41]	0.92	10	24 [8-43]	50 [23-100]	0.11	0.37

10 Data are presented as median [interquartile range].

AHF: acute heart failure, IVC: inferior vena cava, LVEDD: left ventricular end-diastolic diameter, LVEDV: left ventricular end-diastolic volume, LVEF: left ventricular ejection fraction, LVESD: left ventricular end-systolic diameter, LVESV: left ventricular end-systolic volume, TAPSE: tricuspid annular plane systolic excursion.

Supplemental Table 3: Changes of echocardiographic parameters during hospitalization in AHF patients according to below or above

15 **median value of total IV furosemide dose:**

	Total IV furosemide > 280mg				Total IV furosemide ≤ 280mg				Difference in percent change between groups
	n	admission	discharge	p	n	admission	discharge	p	p
Cardiac geometry									
LVEDD (mm)	13	54 [46-63]	53 [43-61]	1.00	11	60 [53-71]	60 [53-65]	0.18	0.33
LVESD (mm)	13	39 [25-45]	31 [28-48]	0.92	11	48 [40-59]	44 [40-55]	0.04	0.13
LVEDV (ml)	12	107 [69-135]	105 [77-176]	0.15	12	131 [100-162]	133 [105-175]	0.91	0.63
LVESV (ml)	10	50 [36-78]	43 [26-68]	0.52	12	71 [57-118]	82 [49-126]	0.39	0.12
Left atrial area (cm ²)	17	26 [22-28]	27 [22-32]	0.92	15	23 [21-28]	23 [18-27]	0.21	0.35
Right atrial area (cm ²)	8	16 [14-20]	18 [17-21]	0.16	5	18 [18-24]	16 [15-23]	0.50	0.35
Cardiac function									
Heart rate (bpm)	16	84 [72-106]	76 [67-92]	0.11	15	95 [83-98]	67 [63-76]	0.002	0.13
LVEF (%)	17	40 [31-50]	41 [30-62]	0.78	18	39 [30-59]	40 [28-54]	0.86	0.83
Stroke volume (mL)	10	34 [28-43]	41 [27-50]	0.33	13	58 [35-61]	50 [37-58]	0.68	0.52
Cardiac index (mL/min/m ²)	8	1.8 [1.6-2.3]	1.7 [1.4-3.1]	0.78	8	2.6 [2.2-3.4]	1.8 [1.4-2.4]	0.04	0.07
TAPSE (mm)	7	19 [14-23]	19 [18-23]	0.55	10	16 [15-18]	19 [17-21]	0.03	0.74
E wave (cm/s)	17	102 [70-142]	82 [74-111]	0.12	18	93 [80-111]	84 [67-109]	0.16	0.86
E wave deceleration time (ms)	17	140 [115-187]	174 [146-220]	0.14	17	121 [103-151]	161 [128-209]	0.01	0.21
A wave (cm/s)	8	89 [30-97]	80 [61-101]	1.00	12	55 [30-82]	67 [41-77]	0.48	0.91
E/A	8	1.33 [0.79-2.42]	1.33 [0.99-1.75]	1.00	10	1.91 [1.30-2.06]	1.36 [1.12-2.32]	0.72	0.70
Medial e'	13	4 [4-5]	6 [4-7]	0.23	16	4 [3-5]	6 [5-7]	0.001	0.05

Lateral e'	15	7 [6-9]	7 [5-10]	0.97	17	7 [5-9]	7 [5-8]	0.30	0.68
Medial E/e'	17	18.5 [16.0-30.5]	17.4 [12.0-29.5]	0.44	20	22.3 [14.5-29.5]	12.5 [10.0-20.9]	0.001	0.02
Lateral E/e'	20	14.8 [11.3-22.5]	13.4 [9.5-18.2]	0.85	21	12.8 [11.3-15.9]	13.0 [9.4-18.0]	0.59	0.74
Mean E/e'	16	18.7 [12.6-31.2]	18.2 [11.9-24.0]	0.57	18	18.9 [16.5-21.8]	12.4 [10.1-20.0]	0.01	0.13
Parameters of venous congestion									
IVC rest diameter (mm)	9	22 [16-25]	13 [13-18]	0.21	12	22 [16-24]	13 [11-18]	0.03	0.51
IVC sniff diameter (mm)	7	17 [13-22]	6 [2-9]	0.04	12	11 [9-23]	7 [2-11]	0.03	0.48
Respiratory variability of IVC diameter (%)	7	32 [9-38]	49 [35-80]	0.06	12	43 [4-51]	47 [36-85]	0.14	0.77

Data are presented as median [interquartile range].

HFREF: heart failure with reduced left ventricular ejection fraction, HFPEF: heart failure with preserved left ventricular ejection fraction, IVC: inferior vena cava, LVEDD: left ventricular end-diastolic diameter, LVEDV: left ventricular end-diastolic volume, LVEF: left ventricular ejection fraction, LVESD: left ventricular end-systolic diameter, LVESV: left ventricular end-systolic volume, TAPSE: tricuspid annular plane systolic excursion.

Supplemental Table 4: Changes of echocardiographic parameters during hospitalization in AHF patients receiving IV furosemide alone or IV furosemide plus vasodilators:

	IV furosemide alone				IV furosemide plus vasodilators				Difference in percent change between groups
	n	admission	discharge	p	n	admission	discharge	p	p
Cardiac geometry									
LVEDD (mm)	18	59 [50-69]	61 [50-67]	0.60	6	55 [52-70]	58 [49-63]	0.53	0.54
LVESD (mm)	18	43 [33-60]	45 [28-57]	0.95	6	43 [37-54]	42 [31-47]	0.27	0.38
LVEDV (ml)	15	132 [99-147]	160 [105-187]	0.33	9	100 [99-120]	110 [80-118]	0.59	0.91
LVESV (ml)	12	85 [50-134]	92 [43-139]	0.86	9	62 [42-68]	51 [43-75]	0.95	0.70
Left atrial area (cm ²)	22	26 [22-29]	27 [21-32]	0.77	9	22 [20-25]	23 [22-27]	0.72	0.65
Right atrial area (cm ²)	11	20 [16-23]	19 [17-23]	0.76	5	18 [18-18]	16 [15-17]	0.89	0.91
Cardiac function									
LVEF (%)	23	34 [28-45]	35 [30-45]	0.31	11	46 [33-60]	50 [40-55]	0.59	0.27
Heart rate (bpm)	23	97 [79-116]	74 [65-92]	0.004	9	81 [72-87]	70 [64-81]	0.04	0.48
Stroke volume (mL)	13	43 [33-61]	45 [36-56]	1.00	9	35 [30-58]	37 [36-66]	0.44	0.74
Cardiac index (mL/min/m ²)	10	2.3 [2.0-3.6]	1.8 [1.4-2.4]	0.29	5	2.2 [1.4-2.3]	1.8 [1.5-2.4]	0.89	0.44
TAPSE (mm)	11	16 [14-19]	19 [18-23]	0.16	6	17 [15-20]	17 [15-19]	0.72	0.59
E wave (cm/s)	26	98 [79-131]	83 [67-100]	0.006	10	98 [85-111]	94 [82-119]	0.65	0.11
E wave deceleration time (ms)	25	129 [104-157]	161 [133-181]	0.004	10	126 [107-151]	167 [123-187]	0.11	0.76
A wave (cm/s)	13	56 [26-90]	63 [46-88]	0.78	7	68 [55-108]	73 [39-120]	0.80	0.39
E/A	11	2.23 [1.03-2.87]	1.45 [1.02-2.17]	0.18	7	1.92 [1.34-2.03]	1.36 [1.24-2.36]	0.87	0.48
Medial e'	21	4 [4-6]	5 [4-7]	0.04	10	4 [3-4]	5 [4-6]	0.09	0.23
Lateral e'	23	7 [5-8]	7 [5-8]	0.79	10	7 [6-8]	7 [5-9]	0.86	0.92

Medial E/e'	22	20.6 [15.8-30.5]	15.4 [10.0-25.0]	0.007	13	23.8 [21.3-29.6]	16.8 [12.3-21.8]	0.12	0.78
Lateral E/e'	24	14.8 [12.3-20.5]	11.9 [8.5-18.4]	0.30	13	14.4 [11.4-16.0]	14.4 [9.0-18.0]	0.97	0.48
Mean E/e'	20	18.5 [15.1-31.2]	16.9 [10.0-22.2]	0.007	12	20.1 [15.1-23.7]	16.8 [12.0-20.1]	0.39	0.58
Parameters of venous congestion									
IVC rest diameter (mm)	16	23 [20-24]	13 [11-18]	0.004	4	18 [16-23]	16 [12-18]	0.11	0.39
IVC sniff diameter (mm)	14	22 [11-24]	6 [0-11]	0.002	4	10 [6-14]	7 [3-9]	0.59	0.23
Respiratory variability of IVC diameter (%)	14	14 [0-40]	50 [23-100]	0.006	4	48 [39-65]	46 [36-77]	0.72	0.06

25 Data are presented as median [interquartile range].

AHF: acute heart failure, IVC: inferior vena cava, LVEDD: left ventricular end-diastolic diameter, LVEDV: left ventricular end-diastolic volume, LVEF: left ventricular ejection fraction, LVESD: left ventricular end-systolic diameter, LVESV: left ventricular end-systolic volume, TAPSE: tricuspid annular plane systolic excursion.

Supplemental Table 5: Changes of biomarkers during hospitalization in patients with AHF and non-cardiac dyspnea:

	AHF				Non-cardiac dyspnea				Difference in percent change between groups
	n	admission	discharge	p	n	admission	discharge	p	p
Markers of cardiovascular stress and congestion:									
BNP (pg/mL)	38	935 [514-2037]	308 [183-609]	<0.001	11	237 [110-257]	57 [35-166]	0.03	0.17
MR-proANP (pmol/L)	59	449 [274-653]	366 [242-549]	<0.001	24	164 [89-288]	140 [71-296]	0.83	0.15
sCD146 (ng/mL)	58	528 [406-654]	450 [374-529]	0.003	24	306 [209-428]	325 [262-535]	0.39	0.01
hsTnI (pg/mL)	54	36 [18-87]	22 [11-66]	0.02	24	12 [6-145]	9 [5-16]	0.04	0.81
Markers of inflammation and fibrosis									
Soluble ST2 (ng/mL)	59	83 [61-132]	42 [36-59]	<0.001	24	69 [54-106]	49 [38-61]	0.02	0.06
CRP (mg/L)	58	9.9 [4.2-32.3]	8.3 [3.5-34.4]	0.36	24	33.3 [14.0-126.9]	24.8 [7.5-53.4]	0.04	0.08
Procalcitonin (ng/mL)	56	0.10 [0.08-0.14]	0.11 [0.07-0.14]	0.37	22	0.12 [0.06-0.36]	0.08 [0.05-0.18]	0.22	0.54
Biological markers of renal function:									
Creatinine (mg/dL)	59	1.18 [0.90-1.53]	1.19 [0.86-1.70]	0.89	24	0.92 [0.75-1.07]	0.85 [0.71-1.03]	0.10	0.006
eGFR (mL/min/1.73m ²)	59	59 [40-75]	56 [38-73]	0.09	24	79 [57-86]	82 [64-100]	0.03	0.006
Cystatin C (mg/L)	57	1.50 [1.20-2.27]	1.78 [1.33-2.59]	<0.001	23	1.45 [1.21-2.14]	1.43 [1.05-1.86]	0.04	<0.001
Urea nitrogen (mmol/L)	57	8.9 [6.9-13.2]	10.2 [7.6-16.0]	0.006	23	7.0 [5.3-10.4]	6.5 [5.2-9.3]	0.29	0.006

Uric acid ($\mu\text{mol/L}$)	57	407 [348-551]	478 [357-545]	0.006	23	336 [290-401]	315 [255-381]	0.52	0.02
NGAL (ng/mL)	54	127 [95-260]	167 [104-263]	0.004	20	125 [82-260]	139 [84-227]	0.82	0.31
Markers of plasma volume:									
Hemoglobin (g/dL)	53	12.9 [11.5-13.9]	12.3 [11.1-13.4]	0.02	20	12.7 [11.2-14.3]	12.2 [10.4-12.8]	0.004	0.04
Hematocrit (%)	53	39 [36-42]	38 [34-41]	0.02	20	39 [33-44]	37 [31-39]	0.007	0.11
Estimated plasma volume	53	4.8 [4.2-5.6]	5.1 [4.4-5.8]	0.03	20	4.9 [3.9-6.0]	5.1 [4.8-6.6]	0.01	0.06

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Data are presented as median [interquartile range]

AHF: acute heart failure, BNP: B-type natriuretic peptide, CRP: C-reactive protein, eGFR: estimated glomerular filtration rate, hsTnI: high sensitive troponin I, MR-proANP: mid-regional pro-atrial natriuretic peptide, NGAL: neutrophil gelatinase associated lipocalin, sCD146: soluble cluster of differentiation 146, ST-2: suppression of tumorigenicity-2.

Supplemental Table 6: Changes of biomarkers during hospitalization in patients with acute HFPEF (LVEF \geq 50%) and HFREF (LVEF $<$ 40%):

	HFPEF (LVEF \geq 50%)				HFREF (LVEF $<$ 40%)				Difference in percent change between groups
	n	admission	discharge	p	n	admission	discharge	p	p
Markers of cardiovascular stress and congestion:									
BNP (pg/mL)	11	848 [414-1491]	228 [198-520]	0.003	19	989 [901-3039]	313 [194-598]	<0.001	0.67
MR-proANP (pmol/L)	21	380 [267-631]	382 [238-537]	0.16	25	515 [305-737]	376 [254-587]	0.003	0.34
sCD146 (ng/mL)	21	500 [379-554]	439 [338-515]	0.06	24	606 [448-705]	483 [423-590]	0.12	0.87
hsTnI (pg/mL)	21	26 [16-87]	13 [10-31]	0.005	20	45 [21-111]	31 [15-89]	0.20	0.40
Markers of inflammation and fibrosis									
Soluble ST2 (ng/mL)	21	82 [57-122]	45 [40-54]	<0.001	25	89 [59-133]	41 [33-53]	<0.001	0.42
CRP (mg/L)	21	11.8 [3.9-34.3]	9.6 [6.4-13.7]	0.29	24	8.0 [3.8-17.9]	4.0 [2.5-27.9]	0.14	0.70
Procalcitonin (ng/mL)	21	0.12 [0.09-0.14]	0.09 [0.08-0.12]	0.04	24	0.10 [0.08-0.17]	0.11 [0.07-0.17]	0.75	0.17
Biological markers of renal function:									
Creatinine (mg/dL)	21	1.10 [0.92-1.35]	1.07 [0.89-1.68]	0.19	25	1.27 [1.05-1.60]	1.34 [1.13-1.64]	0.46	0.28
eGFR (mL/min/1.73m ²)	21	59 [40-69]	55 [36-73]	0.22	25	59 [45-76]	56 [41-68]	0.41	0.28
Cystatin C (mg/L)	20	1.61 [1.28-2.42]	1.90 [1.43-2.80]	0.003	24	1.40 [1.14-1.83]	1.49 [1.30-1.88]	0.002	0.71

Urea nitrogen (mmol/L)	20	9.1 [7.0-12.7]	9.8 [7.6-16.6]	0.04	24	8.5 [7.2-14.1]	10.4 [7.9-16.4]	0.16	0.96
Uric acid (µmol/L)	20	371 [324-479]	472 [316-559]	0.02	24	449 [394-679]	481 [401-635]	0.95	0.09
NGAL (ng/mL)	20	181 [95-286]	217 [105-326]	0.10	22	107 [85-147]	132 [84-188]	0.09	0.78
Markers of plasma volume:									
Hemoglobin (g/dL)	15	11.9 [11.4-13.0]	11.6 [11.0-12.2]	0.09	26	13.5 [12.5-14.4]	13.1 [11.9-13.9]	0.14	0.62
Hematocrit (%)	15	37 [35-39]	36 [34-38]	0.07	26	41 [38-44]	39 [37-43]	0.12	0.68
Estimated plasma volume	15	5.3 [4.7-5.6]	5.6 [5.1-6.0]	0.11	26	4.3 [3.9-4.9]	4.7 [4.1-5.1]	0.16	0.66

Data are presented as median [interquartile range]

AHF: acute heart failure, BNP: B-type natriuretic peptide, CRP: C-reactive protein, eGFR: estimated glomerular filtration rate, hsTnI: high sensitive troponin I, MR-proANP: mid-regional pro-atrial natriuretic peptide, NGAL: neutrophil gelatinase associated lipocalin, sCD146: soluble cluster of differentiation 146, ST-2: suppression of tumorigenicity-2.

Supplemental Table 7: Changes of biomarkers during hospitalization in AHF patients according to below or above median value of total

IV furosemide dose:

	Total IV furosemide > 280mg				Total IV furosemide ≤ 280mg				Difference in percent change between groups
	n	admission	discharge	p	n	admission	discharge	p	p
Markers of cardiovascular stress and congestion:									
BNP (pg/mL)	16	930 [623-2504]	347 [192-593]	<0.001	14	765 [431-1320]	218 [75-305]	0.001	0.05
MR-proANP (pmol/L)	26	416 [272-737]	373 [254-509]	0.08	19	510 [253-700]	366 [227-558]	<0.001	0.26
sCD146 (ng/mL)	26	513 [406-724]	504 [362-589]	0.09	19	500 [343-584]	427 [349-452]	0.16	0.89
hsTnI (pg/mL)	24	36 [17-111]	35 [13-67]	0.28	19	26 [17-62]	16 [9-31]	0.02	0.11
Markers of inflammation and fibrosis									
Soluble ST2 (ng/mL)	26	91 [71-143]	51 [40-74]	<0.001	19	61 [50-117]	39 [34-47]	<0.001	0.98
CRP (mg/L)	26	11.7 [6.7-37.4]	9.3 [4.3-52.3]	0.58	19	10.7 [4.4-28.9]	9.6 [3.2-33.6]	0.24	0.40
Procalcitonin (ng/mL)	25	0.10 [0.08-0.16]	0.11 [0.06-0.16]	0.58	19	0.12 [0.08-0.14]	0.08 [0.07-0.14]	0.87	0.75
Biological markers of renal function:									
Creatinine (mg/dL)	26	1.06 [0.87-1.57]	1.10 [0.81-1.64]	0.55	19	1.18 [0.98-1.58]	1.34 [0.98-1.81]	0.07	0.31
eGFR (mL/min/1.73m ²)	26	59 [37-76]	59 [38-74]	0.42	19	58 [38-72]	52 [37-71]	0.15	0.31
Cystatin C (mg/L)	26	1.47 [1.19-2.37]	1.72 [1.35-2.52]	0.04	18	1.57 [1.23-2.05]	1.88 [1.33-2.59]	0.002	0.45

Urea nitrogen (mmol/L)	26	9.2 [7.1-13.8]	9.4 [6.9-14.2]	0.24	18	8.9 [6.4-13.2]	11.4 [7.7-17.1]	0.03	0.29
Uric acid (μ mol/L)	26	426 [354-593]	425 [322-622]	0.75	18	393 [348-497]	471 [398-521]	0.01	0.07
NGAL (ng/mL)	25	139 [95-270]	171 [113-249]	0.07	17	130 [96-240]	171 [102-263]	0.005	0.62
Markers of plasma volume:									
Hemoglobin (g/dL)	23	12.4 [11.2-13.4]	12.0 [10.9-13.2]	0.48	23	13.3 [11.8-13.7]	12.3 [11.3-13.4]	0.08	0.52
Hematocrit (%)	23	37 [35-41]	38 [33-40]	0.25	23	39 [37-42]	37 [35-42]	0.11	0.61
Estimated plasma volume	23	5.1 [4.3-5.8]	5.1 [4.7-6.2]	0.39	23	4.7 [4.3-5.3]	5.2 [4.3-5.8]	0.11	0.56

45 Data are presented as median [interquartile range]

AHF: acute heart failure, BNP: B-type natriuretic peptide, CRP: C-reactive protein, eGFR: estimated glomerular filtration rate, hsTnI: high sensitive troponin I, MR-proANP: mid-regional pro-atrial natriuretic peptide, NGAL: neutrophil gelatinase associated lipocalin, sCD146: soluble cluster of differentiation 146, ST-2: suppression of tumorigenicity-2.

Supplemental Table 8: Changes of biomarkers during hospitalization in AHF patients receiving IV furosemide only or IV furosemide

50 **plus vasodilators:**

	IV furosemide alone				IV furosemide plus vasodilators				Difference in percent change between groups
	n	admission	discharge	p	n	admission	discharge	p	p
Markers of cardiovascular stress and congestion:									
BNP (pg/mL)	21	938 [732-2375]	311 [196-573]	<0.001	10	1660 [797-2544]	349 [213-867]	0.005	0.66
MR-proANP (pmol/L)	27	523 [300-765]	433 [283-643]	0.01	13	545 [346-770]	433 [270-678]	0.005	0.39
sCD146 (ng/mL)	27	500 [403-647]	433 [399-509]	0.09	13	483 [331-554]	389 [325-500]	0.25	0.69
hsTnI (pg/mL)	25	45 [19-116]	21 [14-54]	0.04	13	25 [18-53]	13 [10-74]	0.81	0.41
Markers of inflammation and fibrosis									
Soluble ST2 (ng/mL)	27	85 [60-136]	41 [37-60]	<0.001	13	83 [72-138]	42 [34-67]	0.002	0.59
CRP (mg/L)	26	8.0 [4.2-28.9]	7.8 [3.0-26.8]	0.06	13	17.4 [6.8-34.3]	16.7 [6.4-37.2]	0.28	0.23
Procalcitonin (ng/mL)	25	0.10 [0.08-0.12]	0.09 [0.06-0.14]	0.19	13	0.14 [0.12-0.20]	0.14 [0.08-0.18]	0.92	0.43
Biological markers of renal function:									
Creatinine (mg/dL)	27	1.17 [0.88-1.59]	1.14 [0.91-1.57]	0.77	13	1.38 [1.10-1.60]	1.68 [1.34-1.93]	0.02	0.002
eGFR (mL/min/1.73m ²)	27	62 [37-75]	62 [39-74]	0.79	13	53 [34-62]	41 [32-56]	0.009	0.002
Cystatin C (mg/L)	27	1.33 [1.20-2.03]	1.62 [1.34-2.39]	<0.001	13	1.98 [1.42-2.35]	2.43 [1.33-2.81]	0.01	0.71

Urea nitrogen (mmol/L)	27	8.9 [6.8-13.8]	11.4 [7.5-16.4]	0.26	13	10.3 [7.3-12.4]	12.7 [9.2-18.3]	0.02	0.11
Uric acid (μmol/L)	27	407 [356-576]	449 [369-569]	0.08	13	422 [348-551]	511 [398-642]	0.07	0.16
NGAL (ng/mL)	24	119 [91-265]	154 [106-256]	0.42	13	186 [114-275]	234 [102-318]	0.06	0.91
Markers of plasma volume:									
Hemoglobin (g/dL)	31	13.0 [11.8-13.9]	12.5 [11.2-13.5]	0.20	12	13.2 [11.0-13.8]	11.7 [11.0-12.8]	0.05	0.22
Hematocrit (%)	31	40 [36-42]	38 [35-42]	0.10	12	38 [35-41]	35 [34-37]	0.13	0.48
Estimated plasma volume	31	4.8 [4.1-5.5]	5.0 [4.3-5.7]	0.15	12	4.7 [4.2-5.9]	5.5 [4.9-6.0]	0.07	0.27

Data are presented as median [interquartile range]

AHF: acute heart failure, BNP: B-type natriuretic peptide, CRP: C-reactive protein, eGFR: estimated glomerular filtration rate, hsTnI: high sensitive troponin I, MR-proANP: mid-regional pro-atrial natriuretic peptide, NGAL: neutrophil gelatinase associated lipocalin, sCD146: soluble