

manipulation of the serum chloride concentration could be a central therapeutic target for controlling body fluid in HF patients.

**Purpose:** The present study examined the effects of the chloride-regaining diuretic acetazolamide on plasma volume, serum electrolytes and renal function in comparison with conventional chloride-depletion diuretics.

**Methods:** I retrospectively analysed 13 data from treated with acetazolamide (Diamox treatment; group A, n=13) or conventional diuretic treatment with a combination of loop diuretics, aldosterone blockade, and thiazide diuretics (group B, n=13), which were matched based on diuresis-induced weight reduction ( $\geq 1$ kg) during resolution of worsening HF. Changes in plasma volume (Strauss method), renal function, and serum electrolytes under treatment were determined by peripheral blood tests.

**Results:** Treatment duration (27.6 $\pm$ 12.7 vs. 26.7 $\pm$ 15.8 days) and body weight reduction by treatment (-2.23 $\pm$ 1.11 vs -2.22 $\pm$ 1.06 kg; Figure 1A) did not differ between the A and B groups. After each treatment, the serum chloride concentration markedly increased in group A, but decreased in group B (+5.31 $\pm$ 4.91 vs. -4.54 $\pm$ 4.68 mEq/L,  $p < 0.0001$ ; Figure 1B). Plasma volume (0.63 $\pm$ 13.1 vs. -12.1 $\pm$ 10.5%,  $p < 0.01$ ; Figure 1C) and renal function based on changes in the serum creatinine (0.048 $\pm$ 0.12 vs. 0.21 $\pm$ 0.24,  $p < 0.047$ ; Figure 1D) were better preserved in group A than in group B.

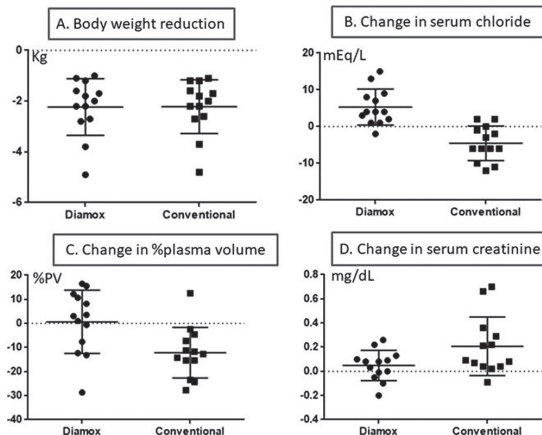


Figure 1

**Conclusions:** Under achievement of the same body weight reduction by diuresis, plasma volume and renal function were better preserved by diuretic treatment with acetazolamide than with conventional diuretic treatment. These differential effects are in accordance with my “chloride theory” for HF pathophysiology.

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**Coronary artery bypass graft versus percutaneous coronary intervention in patients presented with acute heart failure**

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**Background:** Myocardial ischemia is a leading cause of acute heart failure (AHF). However, optimal revascularization strategies in AHF are in doubt.

**Objectives:** We aimed to compare two revascularization strategies, coronary artery bypass graft (CABG) and percutaneous coronary intervention (PCI), in patients presented with AHF.

**Methods:** Among the 5,625 consecutive patients enrolled prospectively in The Korean Acute Heart Failure registry from March, 2011 and February, 2014, 717 patients who received CABG or PCI during the index hospitalization for AHF were included in this analysis. We compared adverse outcomes (death, re-hospitalization for heart failure aggravation or cardiovascular causes, ischemic stroke, a composite outcome of death and re-hospitalization for HF aggravation or cardiovascular causes) with the use of propensity-score matching.

**Results:** For the propensity score-matched cohort with 190 patients, CABG had a lower risk of all-cause mortality (HR 0.560, CI 0.334–0.938,  $p = 0.0274$ ) during median follow-up of 4 years. There was also a trend toward lower rates of re-hospitalization due to cardiovascular events or HF aggravation. Subgroup analysis revealed that the adverse outcomes were significantly lower in the CABG group than in PCI group especially in patients with old age, three vessel diseases, significant proximal left anterior descending artery disease, and those without left main vessel disease or chronic total occlusion.

**Conclusions:** Compared with PCI, CABG is associated with significant lower all-cause mortality in patients with AHF. There should be a further study to evaluate proper revascularization strategy in AHF.

**Funding Acknowledgements:** This work was supported by grants from Research of Korea Centers for Disease Control and Prevention

**DIGITAL HEALTH ANALYSIS**

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**Underuse of non-invasive functional imaging in patients at intermediate risk of coronary artery disease. A decision support system in the clinical practice. The ARTICA database**

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**Background:** Non-invasive functional imaging (NIFI) can accurately rule out hemodynamically significant coronary artery disease (CAD) and can act as a gatekeeper for invasive revascularization.

**Purpose:** To analyze an integrated approach by a clinical decision support system (DSS) vs standard care (STD) in patients (pts) at intermediate pre-test likelihood of CAD referred for stable chest pain evaluation.

**Methods:** 498 pts (303 males and 195 females, age 56 $\pm$ 6 years) were referred for stable chest pain evaluation over a 16 month period in three different hospitals. A computerized browsing automated DSS and a human cardiologist STD were applied during the same day visit. Pre-test likelihood of CAD was based on Clinical score + coronary artery calcium scoring (CACS). Significant CAD ( $> 50\%$  coronary stenosis) criteria were applied in all pts by computerized tomography coronary angiography (CTCA).

**Results:** Pre-test likelihood of CAD is shown in the Table. 281 (56.4%) pts were classified as “No further test (NFT)”, 182 (36.5%) “Ex test (ET)/Functional Imaging (FI)” and only 34 (6.8%) “CTCA” and 1 (0.3%) “ICA” by DSS. Of note, DSS “ET/FI” + “NFT” and STD “ET/FI” + “NFT” + “CTA” subgroups identified respectively 391 (78.5%) and 372 (74.6%) pts free of significant CAD or inducible myocardial ischemia ( $p = 0.3$ ). The diagnostic accuracy of DSS “ET/FI” + “NFT” (without “CTA” data) class resulted 92.5%.

Table 1

(n/%)	Clinical Score + CAC (n/%)		
	Low-to-intermediate (212 / 21.5)	Intermediate (277 / 28.2)	Intermediate-to-high (9 / 0.9)
<b>CDSS (n/%)</b>			
NFT (281 / 56.4)	121 / 57.0	160 / 57.7	0 / 0
ET/FI (182 / 36.5)	68 / 32.0	109 / 39.3	5 / 55.5
CTA (34 / 6.8)	23 / 11.0	8 / 3.0	3 / 33.3
ICA (1 / 0.3)	0 / 0	0 / 0	1 / 11.2
<b>STD (n/%)</b>			
NFT (6 / 1.3)	6 / 2.8	0 / 0	0 / 0
ET/FI (69 / 13.8)	34 / 16.1	35 / 12.6	0 / 0
CTA (404 / 81.1)	172 / 81.1	227 / 81.9	5 / 55.5
ICA (19 / 3.8)	0 / 0	15 / 5.5	4 / 45.5

**Conclusions:** The data suggests that direct visualization of the coronary arteries did not add any value for the diagnosis of CAD. However, it should be noted that “No further test +/- functional imaging” class is a powerful negative predictive value for significant CAD. Therefore DSS could represent a valid solution for prescribing the correct test for risk stratification at point-of-care.

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**Usefulness of clinical decision support system as tool of good clinical practice in patients at low risk of coronary artery disease. The ARTICA co-operative database**

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**Background:** The use of decision support systems (DSS) at the point of care may enhance the appropriateness of clinical cardiology versus human physician standard care (STD) bringing evidence-based medicine at the point-of-care.

**Purpose:** To analyze DSS results vs standard care (STD) in the clinical workflow of patients (pts) at low, low-to-intermediate pre test likelihood (L-LI) of coronary artery disease (CAD).

**Methods:** 692 pts (403 males and 289 females, age 57 $\pm$ 7 years) with L-LI of CAD were referred for stable chest pain evaluation over a 16 month period in three different hospitals. A browsing computerized automated DSS and a human cardiologist STD were applied during the same day visit. Pre-test likelihood of CAD was based on clinical score + coronary artery calcium score (CACS). Significant CAD ( $> 50\%$  coronary stenosis) criteria were applied in all pts by computerized tomography coronary angiography (CTCA).

**Results:** Distribution of population for DSS and STD is shown in the table. 498 (72%) pts were classified as “No further test (NFT)”, 110 (15.9%) “Exercise test