

Study of Dietary Intervention Under 100 MMOL in Heart Failure



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University Hospital Foundation







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Heart Failure and Dietary Sodium

- HF is associated with:
 - neurohormonal activation
 - abnormalities in autonomic control
 - sodium and water retention
- Clinicians have focused on dietary sodium and water restriction to minimize the risk of volume overload for > 100 years
- Little evidence supports this practice

Dietary Sodium Intake



SODIUM-HF

Dietary sodium: Observational studies



n= 123 patients with HF

Arcand et al. Am J Clin Nutr. 2011.



Dietary sodium reduction: RCT

n= 195 patients with HF, Outpatient, Mexico city



Time (Months)

Intervention group: Dietary recommendations for sodium restriction to <2400 mg/day provided by a dietitian.
Control Group: Usual dietary recommendations for dietary sodium reduction.

Systematic review: 9 studies All < 100 patients Mixed interventions

No consistent results on any outcome





SODIUM-HF Objectives

Evaluate the effects of a low-sodium diet, compared to usual care, in patients with HF, on a 12 month outcome of:

 Primary Endpoint: Composite clinical outcome of All-cause mortality, CV hospitalizations, CV ED visits

- Secondary Endpoints:

- Quality of life (by KCCQ)
- Exercise capacity (by 6MWT)
- NYHA class



SODIUM-HF: Trial Design

841 patients with heart failure (NYHA II-III) on optimally tolerated medical therapy



SODIUM-HF: Sites



SODIUM-HF



Canada, Mexico, Chile, Colombia, Australia, New Zealand





SODIUM-HF: In/Exclusion criteria

SODIUM Inclusion Criteria

SODIUM Exclusion Criteria

- ✓ 18 years or older and willing/able to sign informed consent.
- Confirmed diagnosis of HF (both reduced and preserved systolic function eligible)
- ✓ NYHA Class II-III

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- On optimally tolerated medical therapy according to CCS guidelines
- Patients with an average dietary intake of <1500 mg Na/day
- Serum sodium <130 mmol/L</p>
- Hemodialysis-dependent chronic renal failure (or glomerular filtration rate <20 mL/min)
- Uncontrolled thyroid disorder or end-stage hepatic failure
- × Cardiac device or revascularization procedure in previous month or planned in the next 3 months
 - Hospitalization due cardiovascular causes in the previous 1 month
- Uncontrolled atrial fibrillation (resting heart rate >90 bpm)
- Active malignancy with an expected life expectancy <2 years
- × Another comorbid condition or situation which could preclude compliance with the protocol
- × Enrolled in another interventional research study

Colin-Ramirez, AHJ, 2018 SODIUM-HF

SODIUM-HF: Intervention

Patients randomized to one of two study arms:

- 1. Low-sodium containing diet
 - <1500 mg daily (<65 mmol/daily)

2. Usual care

• general advice to limit dietary sodium as provided in routine clinical practice





SODIUM-HF: Intervention

- Samples of **menus** at different levels of energy requirement (1400-2200 kcal)
- Patient might **interchange** any of the food items included in the menus by another one included in the recommended foods lists of the same food group that the original one included in the menu.
- Food individualized to local region/country
- If energy requirements were adjusted during a follow-up visit, new sample menus were provided.
- 3 day food records for each visit



Colin-Ramirez, *AHJ*, 2018 Colin-Ramirez, *CJC Open*, 2019



SODIUM-HF: Sample Size / DMC

- Sample size:
 - Based on the primary composite outcome
 - Expected event rate of 25% in usual care arm
 - **30%** reduction in the primary outcome
 - 80% power, two-sided type I error rate of 0.05
 - Total enrollment of 992 patients
- The Data Monitoring Committee
 - Reviewed data from the first **500** participants with complete 12-month follow-up
 - Mandate was to advise on *futility* (if conditional power was <20%) or *efficacy* (two-sided p-value <0.001).
 - This review, in addition to an assessment of trial operational feasibility and the impact of the COVID-19 pandemic, led to an early stopping with the last patient enrolled on December 09, 2020 and complete 12 month follow-up in December 2021.



SODIUM-HF: Baseline Characteristics

	Low sodium diet group	Usual care group
	n=397	n=409
Age, years	66 (57–73)	67 (58–75)
Female Sex	127 (32%)	141 (34%)
Geographical region		
Canada	230 (58%)	241 (59%)
Australia and New Zealand	79 (20%)	78 (19%)
Mexico, Chile, and Colombia	88 (22%)	90 (22%)
Diagnosed with HF for ≥1 year	269 (68%)	282 (69%)
Hospitalised for HF in past 12 months	129 (32%)	141 (34%)
Ejection fraction	36 (28–48)	35 (27–50)



SODIUM-HF: Baseline Characteristics

	Low sodium diet group n=397	Usual care group n=409
Medical history		
Coronary artery disease	187 (47%)	186 (45%)
Atrial fibrillation or flutter	156 (39%)	173 (42%)
Diabetes (type 1 or 2)	132 (33%)	156 (38%)
Vital signs and physical findings		
BMI, kg/m²	30 (26–35)	31 (27–36)
Heart rate, beats per min	69 (61–76)	69 (61–77)
Systolic blood pressure, mm Hg	118 (105–129)	118 (104–130)
Laboratory values		
eGFR, mL/min per 1·73m ²	61 (46–75)	58 (42–71)





Dietary sodium intake





Outcomes

Primary Outcome



CIHR IRSC



Secondary Outcomes







Change in NYHA class



NYHA class:



Change in KCCQ score



CIHR IRSC

Hospital Foundation SODIUM-HF

Change in 6 min walk test distance



Limitations

- There was a sodium reduction of 415 mg / day by 12 months, and greater reductions in daily sodium or alternatively, enrolling patients with markedly higher dietary sodium may or may not produce different results.
- The trial was stopped early
- Lower than anticipated event rate
- Inclusion criteria were pragmatic and no NT-proBNP required





Conclusions

- 1. In ambulatory patients with HF, a dietary intervention to reduce sodium intake did not reduce clinical events.
- 2. There was a modest benefit on quality of life as measured by the KCCQ, and in NYHA class.
- 3. The 6-minute walk test was not statistically different between groups.





Implications

A low-sodium diet as done in SODIUM-HF:

- <u>Clinicians</u>: as a therapy to improve QOL
- <u>Patients</u>: as part of an overall health strategy
- <u>Guidelines</u>: informs with best evidence





SODIUM-HF Participants

 A special thank you to those patients who volunteered their time and effort to participate in the SODIUM-HF trial

