

Retrospective Review of the Management of Hyponatremia in Adults at Surrey Memorial Hospital (SMH)

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Background

- Hyponatremia is the most common electrolyte abnormality encountered in clinical practice, occurring in 15-30% of hospitalized patients¹
- Severe symptoms of low serum sodium (SrNa) include: lethargy, confusion, decreased level of consciousness, and seizures²
- Administration of normal saline (0.9% NaCl) or hypertonic saline (3% NaCl) are methods used to treat hyponatremia, particularly when SrNa <120 mmol/L
- Overly rapid correction of SrNa can lead to neurological complications, including osmotic demyelination syndrome (ODS). To minimize this risk literature recommends:
 - Maximum rate of SrNa correction of 10-12 mmol/L in 24 hours and/or less than 18 mmol/L in 48 hours¹
 - Frequent monitoring (e.g., every 2-4 hours) until asymptomatic, then every 4-8 hours during treatment³
- Patients at SMH have been treated outside of these recommendations

Objective

Primary

- To describe how hyponatremia (SrNa <120 mmol/L) is managed and monitored for adult inpatients at SMH
- To identify the number and proportion of patients where sodium was replaced at a greater rate than suggested and thus at risk of neurological complications

Secondary

- To investigate and describe the incidence of neurological complications possibly related to accelerated sodium repletion

Methods

Design

- Retrospective chart review of patients diagnosed with “hypo-osmolality and hyponatremia” between January and June 2011

Inclusion Criteria

- Age 19 years or older
- Serum sodium less than or equal to 120 mmol/L

Exclusion Criteria

- Imminent death (within 1 month) and receiving comfort measures only

Results

Table 1: Baseline Patient Demographics N=50

Parameter	N (%)
Mean age, years (range)	72 (49-96)
Male, N (%)	16 (32)
Median Serum Sodium (range)	115 (<100-119)
Comorbidities, N (%)	
• Hypertension	37 (74)
• Alcoholism	10 (20)
• Renal Insufficiency	9 (18)
• Hypothyroidism	9 (18)
• Other	16 (32)
Symptoms of hyponatremia ^a , N (%)	
• Symptomatic	36 (72)
• Asymptomatic	6 (12)
• Unknown	8 (16)
Duration of hyponatremia ^b , N (%)	
• Less than 48 hours	0
• Greater than 48 hours	9 (18)
• Unknown	41 (82)
Proposed Etiologies of Hyponatremia, N (%)	
• Diuretic use	23 (46)
• SIADH	14 (28)
• Vomiting	11 (22)
• Medication	11 (22)
• Low solute intake	10 (20)
• Hypothyroidism	4 (8)
• Glucocorticoid deficiency	5 (10)
• Other	11 (22)
Implicated Medications, N (%)	
• Hydrochlorothiazide	21 (42)
• Venlafaxine	5 (10)
• ACEI	4 (8)
• Citalopram	2 (4)

^aNausea, vomiting, dizziness, drowsiness, headache, weakness, lethargy, ataxia, confusion, decreased level of consciousness, delirium, and seizure

^b<135 mmol/L

Figure 1: Initial Treatment for Hyponatremia (first 24 hours)

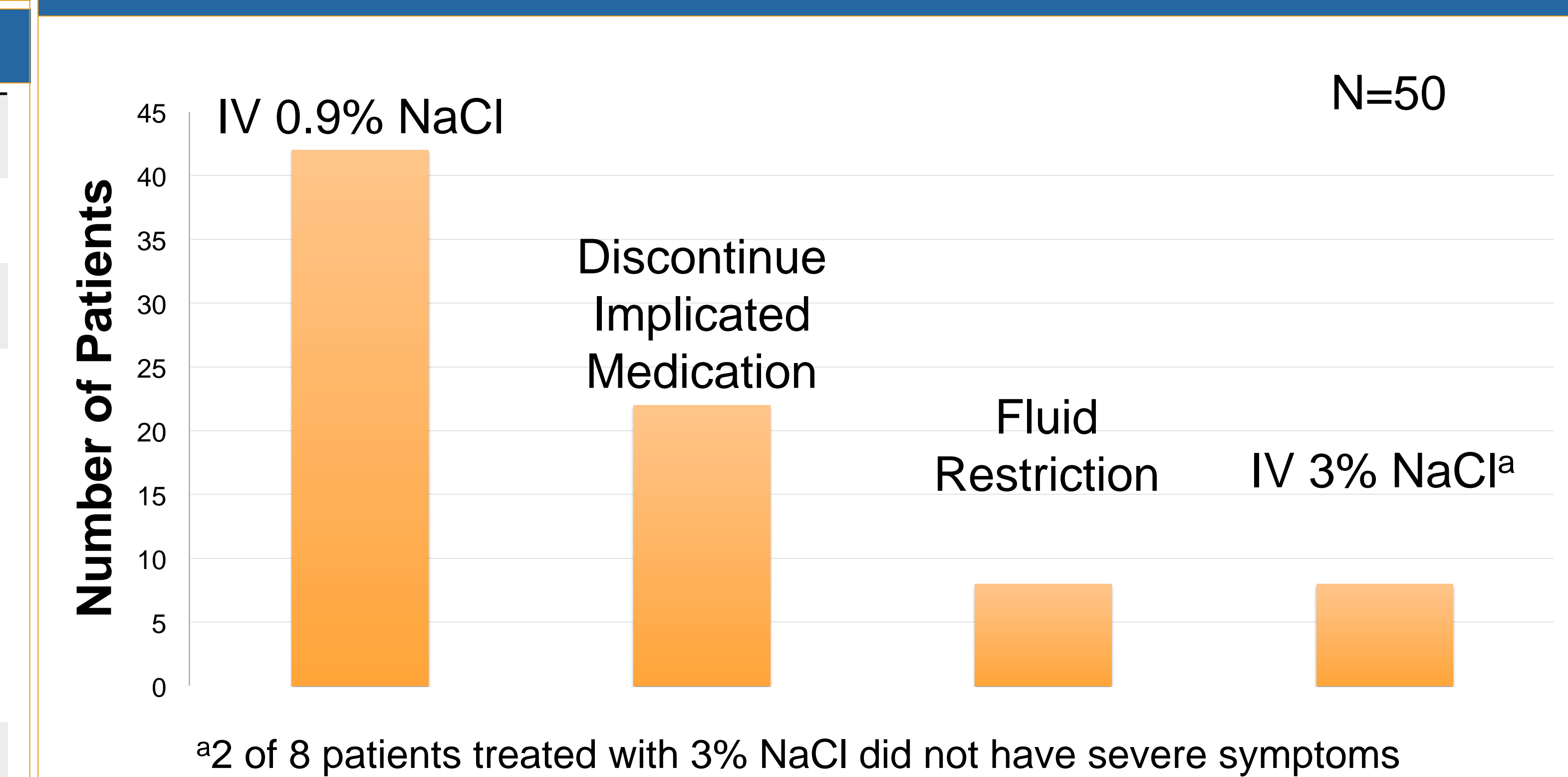


Figure 2: Patients Overcorrected

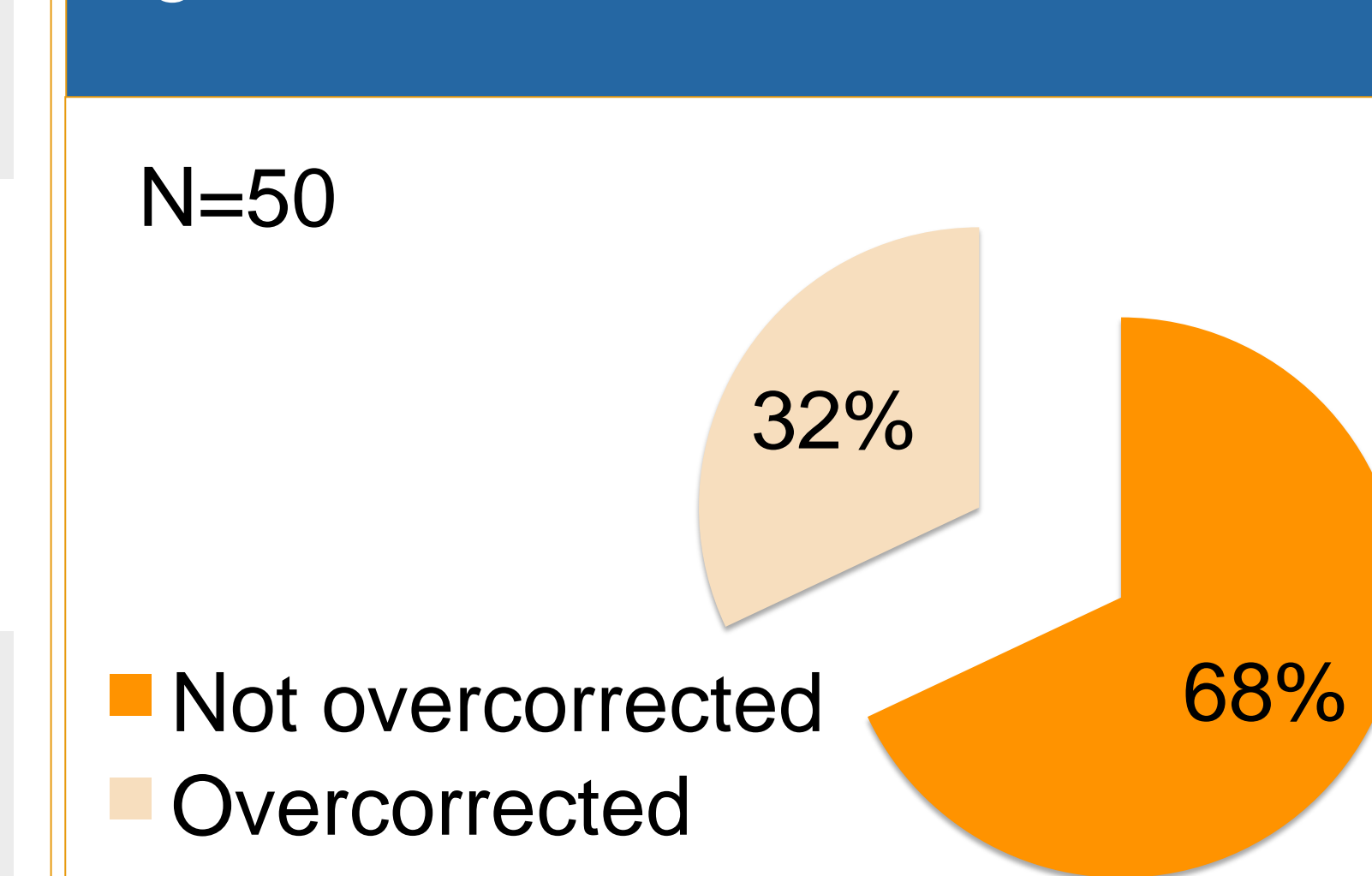
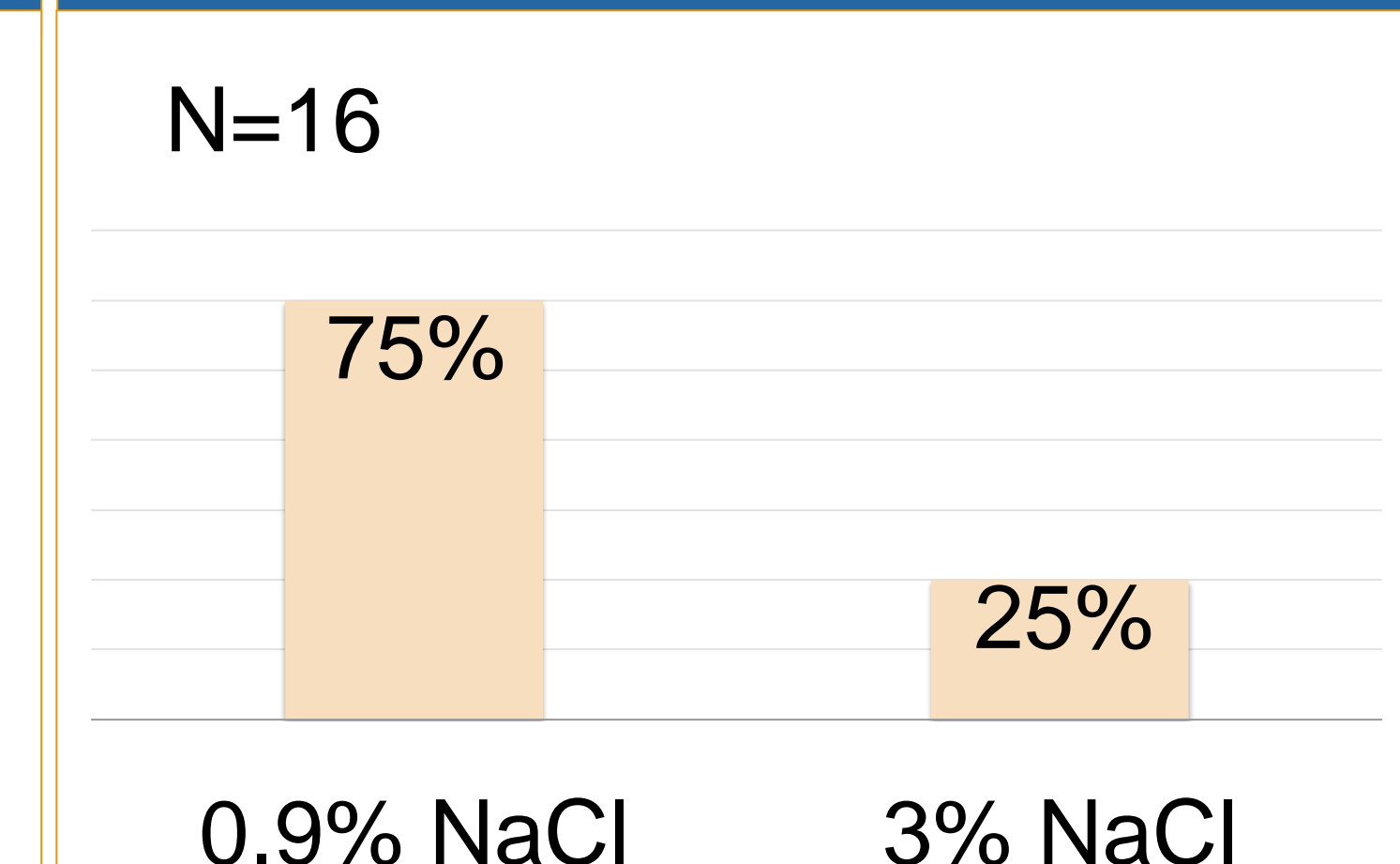


Figure 3: Initial IV Fluid Used in Overcorrected Patients



Monitoring

- Median time to second SrNa was 10.3 hours (1-23.9) and median frequency of SrNa drawn in the first 24 hours was 1.5 (1-5)

Neurological complications

- 1 of the 16 patients overcorrected had neurological complications and ODS confirmed on MRI

Limitations

- Potential for incomplete documentation with a retrospective review
- Small sample size may not be representative of practice at SMH
- Overcorrection may be under or over reported due to variable timing of blood sampling

Conclusions

- Primary method of correction was IV 0.9% NaCl
- Monitoring practices were less frequent than recommended
- 32% of patients exceeded recommended correction rates and 1 experienced documented neurological complications

Implications to practice:

- Overcorrection can occur with either 3% or 0.9% NaCl solutions
- Implementation of a protocol can provide guidance for the optimal management and monitoring of hyponatremia

