

Iponatremia in Geriatria: Iponatremia ipovolemica

Marco Pala

U.O.C di Geriatria e Ortogeriatrics

Dipartimento Medico. Azienda Ospedaliera Universitaria di Ferrara

Caso clinico



Donna di 89 anni arriva in P.S. inviata dal Curante per subocclusione intestinale, decadimento delle condizioni generali, astenia, vomito, stato confusionale in ospite di struttura protetta.

Caso clinico



Anamnesi Patologica Remota:

sindrome ipocinetica

cardiopatía ipertensiva

FA permanente

Sindrome depressiva

Deterioramento cognitivo severo

Stipsi cronica

Anamnesi Patologica Prossima: da circa una settimana astenia e stato confusionale in recente trauma al bacino da caduta accidentale.

Terapia in corso:



enoxaparina 4000 UI

ASA 100 mg

sertralina 50 mg

pantoprazolo 20 mg

ramipril 10 mg

furosemide 25 mg 1 cpx2

Idroclotiazide+amiloride 5 mg+50mg 1 cp

bisoprololo 1,25 mg

zolpidem 10 mg

acido folico 5 mg

promazina 10 gtt ab

macrogol 1 busta ab

Caso clinico



- **Esame obiettivo:**

- Vigile, disorientata s/t, non collaborante; disidratazione con stato da malnutrizione calorico-proteica.
- Toni cardiaci aritmici, Mv ridotto su tutto l'ambito fini crepitazioni alla base di destra; addome trattabile, pastoso non dolente, peristalsi torpida; portatrice di foley a permanenza.

- **Parametri vitali nella norma:**

- PA 100/80 mmHg
 - Fc 79 bpm
 - SpO2 92% in AA
 - Tc 36.5°C
 - Peso 35 Kg Altezza 155 cm BMI 14.57 (grave magrezza)
-

Esami strumentali



- ECG: FA a frequenza ventricolare media di 80/min.
 - Rx torace: non addensamenti pleuroparenchimali in atto.
 - Rx diretta addome: non aria libera, coprostasi diffusa.
-

Esami ematochimici



[0] EMOCROMO

GLOBULI BIANCHI :	9.71	x10 ³ /μl
GLOBULI ROSSI :	4.84	x10 ⁶ /μl
HGB :	9.9	g/dl
HCT :	33	%
MCV :	68	fl
MCH :	20.5	Pg
MCHC :	30.1	g/dl
PLT :	343	x10 ³ /μl
NEUTROFILI :	7.89	x10 ³ /μl
LINFOCITI :	0.74	x10 ³ /μl
MONOCITI :	1.08	x10 ³ /μl
EOSINOFILI:	0.00	x10 ³ /μl
BASOFILI :	0.00	x10 ³ /μl

[0] PT (Quick) 1.10 INR

[0] .

FIBRINOGENO : 512 mg/dl

[0] APTT 0.90 ratio

[0] DIMERO D : 988 ng/ml

[0] UREA : *siero* 69 mg/dl

[0] CREATININA : *siero* 1.52 mg/dl

[0] SODIO : *siero* 119 mEq/l

[0] POTASSIO : *siero* 4.7 mEq/l

[0] CLORO : *siero* 80 mEq/l

[0] TSH : 3.46 μU/ml

[0] GLUCOSIO : *siero* 76 mg/dl

Riflessioni



- Anni 89
 - Disidratata e con malnutrizione calorico proteica
 - Comorbidità
 - Polifarmacoterapia
 - Subocclusione intestinale
- SODIO 119 mEq/l → IPONATREMIA CRONICA SEVERA
PAUCISINTOMATICA (astenia, vomito, stato confusionale??)
-





Approccio terapeutico



- Sospesa tutta la terapia farmacologica
- Inizia NaCl 0,9% a target terapeutico di 6 mEq/l/die

Incremento di $sNa = ((Na \text{ soluzione infusa}) - sNa) / TBW + 1$

- Trattamento della stipsi

Decorso clinico



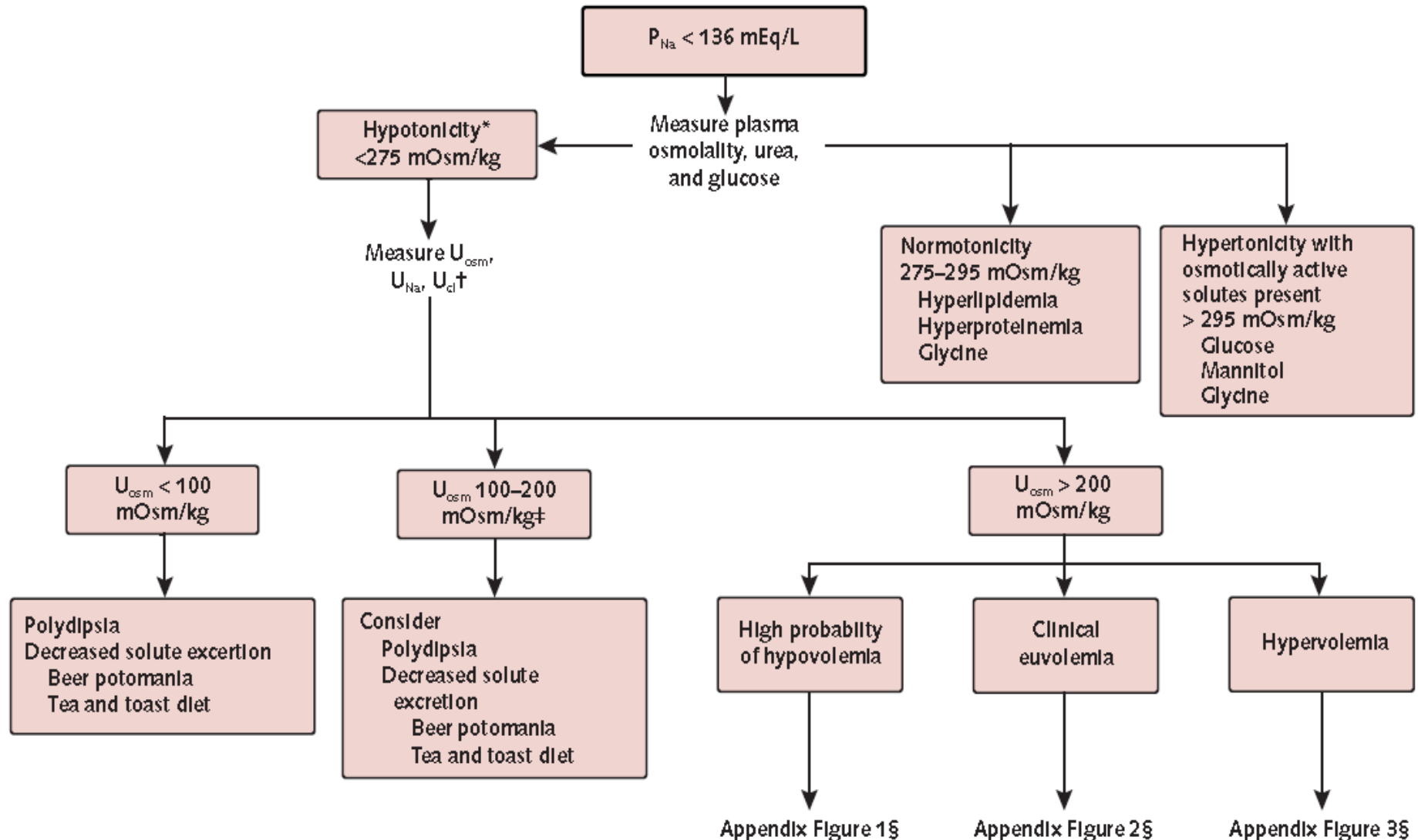
- **Graduale ripristino dell'equilibrio idro-elettrolitico e della canalizzazione intestinale.**
- **Miglioramento dello stato di vigilanza e del comportamento.**
- **Mobilizzata in poltrona**
- **Ripristino dell'alimentazione per via naturale**
- **Stabilizzazione delle condizioni generali fino alla dimissione.**
- **Terapia alla dimissione: bisoprololo 1.25 mg; zolpidem 10 mg.**

Iponatremia

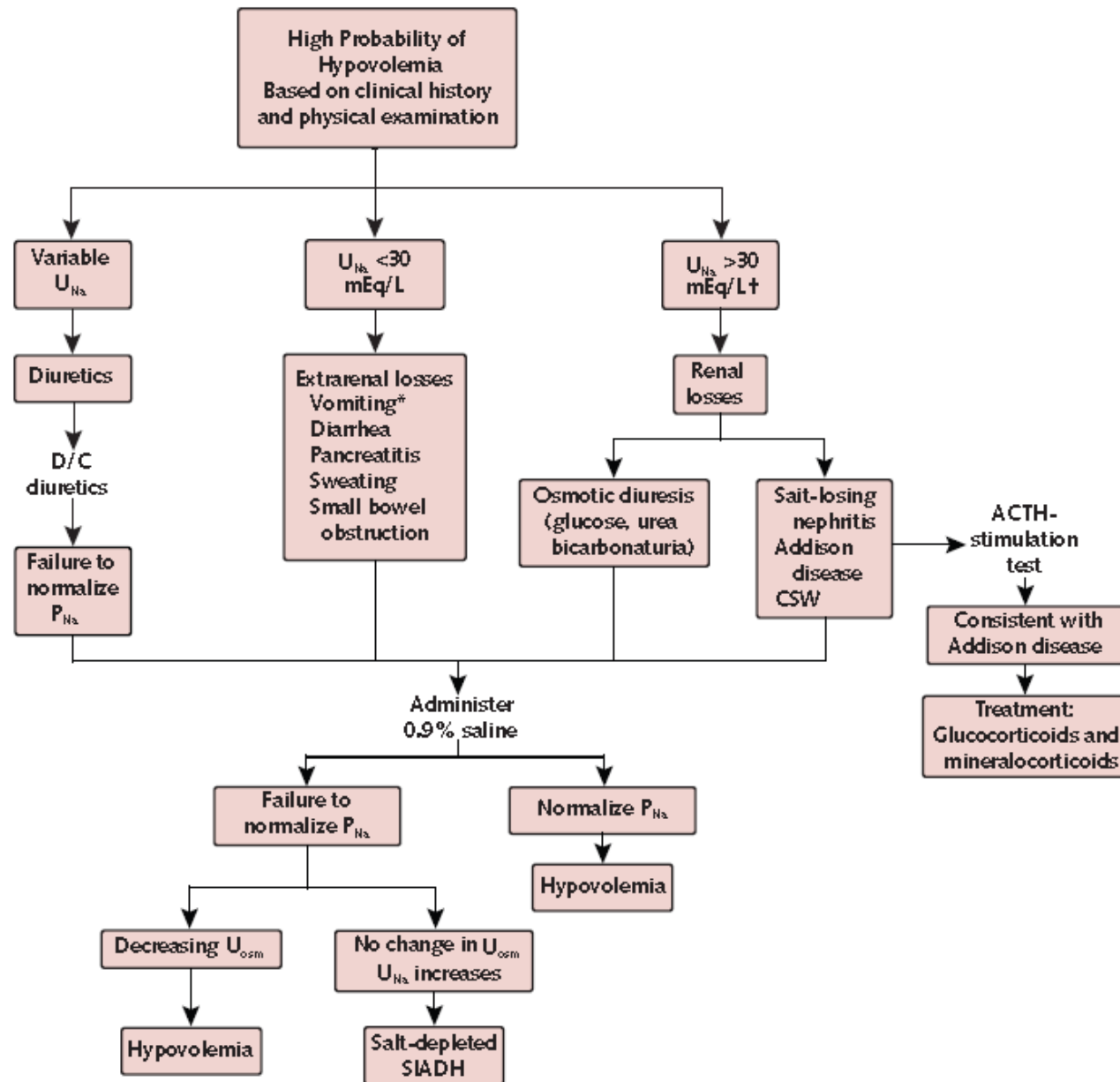


L'iponatremia è il disturbo elettrolitico più frequente negli anziani, è di origine multifattoriale.

Approccio alla diagnosi di iponatremia



Approccio alla diagnosi di iponatremia ipovolemica



Cause di iponatremia ipovolemica



Table 1. Major Causes of Hyponatremia Based on Volume Status

Hypovolemia

Extrarenal losses

Vomiting

Diarrhea

Pancreatitis

Sweating

Small bowel obstruction

Renal losses

Osmotic diuresis

Cerebral salt wasting

Salt-losing nephritis

Diuretics

Addison disease|

Iponatremia in Geriatria 2014



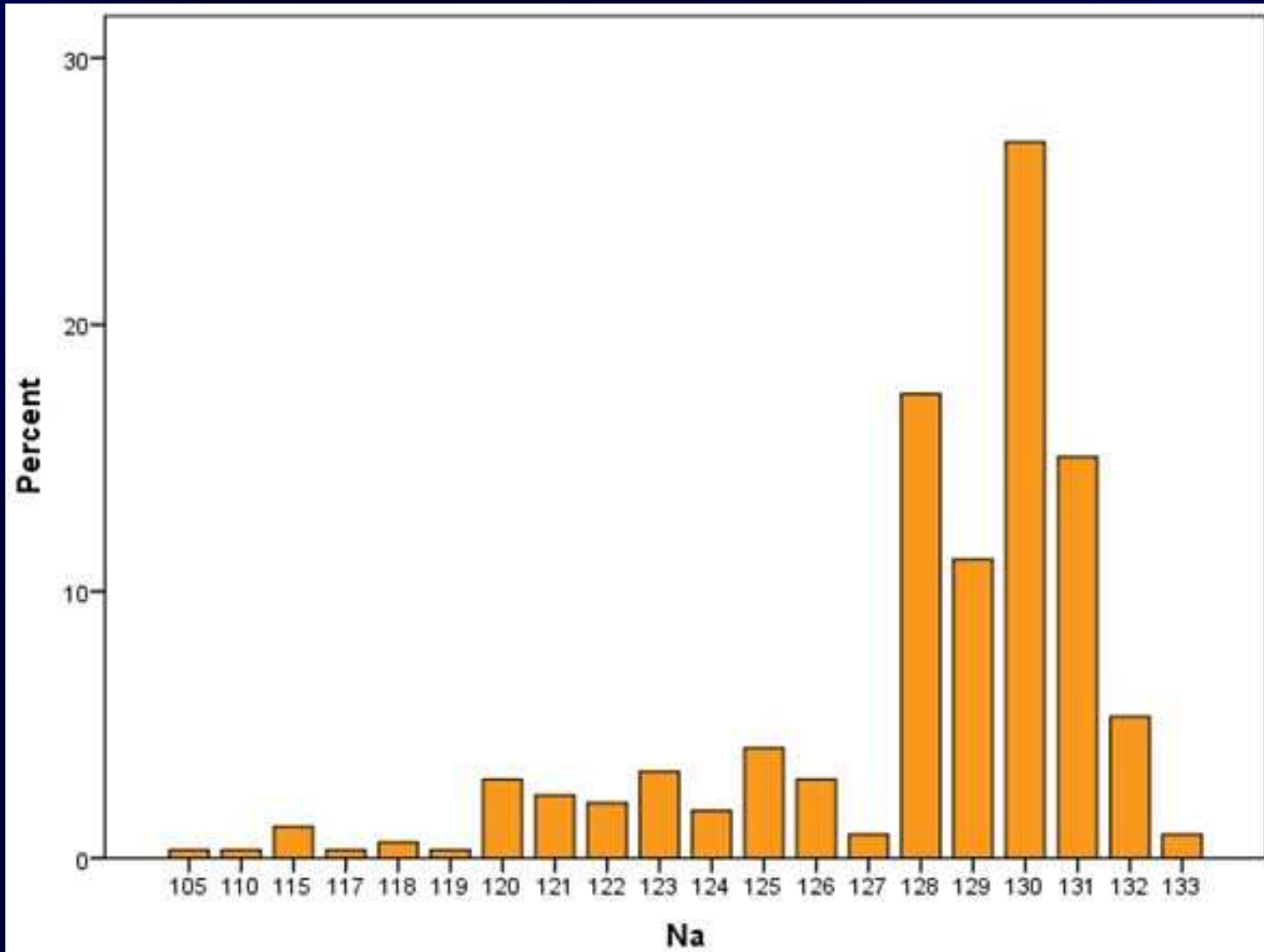
Totale paziente 2014		1246(100%)
Totale iponatramia		339(27,2%)
Età		85,6±5,7
Na+		128±3,8
Hb		8,5±0,6
Maschi	36,90%	125 (36,9%)
Femmine	63,10%	214 (63,1%)

Iponatremia in Geriatria 2014



ADL	0	43,10%	146 (43,1%)
	1	26,80%	91 (26,8%)
	2	25,40%	86 (25,4%)
	3	4,70%	16 (4,7%)
IADL	0	47,50%	161 (47,5%)
	1	35,10%	119 (35,1%)
	2	15,60%	53 (15,6%)
	3	1,80%	6 (1,8%)
SPSMQ	0	22,70%	77 (22,7%)
	1	65,20%	221 (65,2%)
	2	12,10%	41 (12,1%)

Iponatremia in Geriatrics 2014



Iponatremia in Geriatria 2014

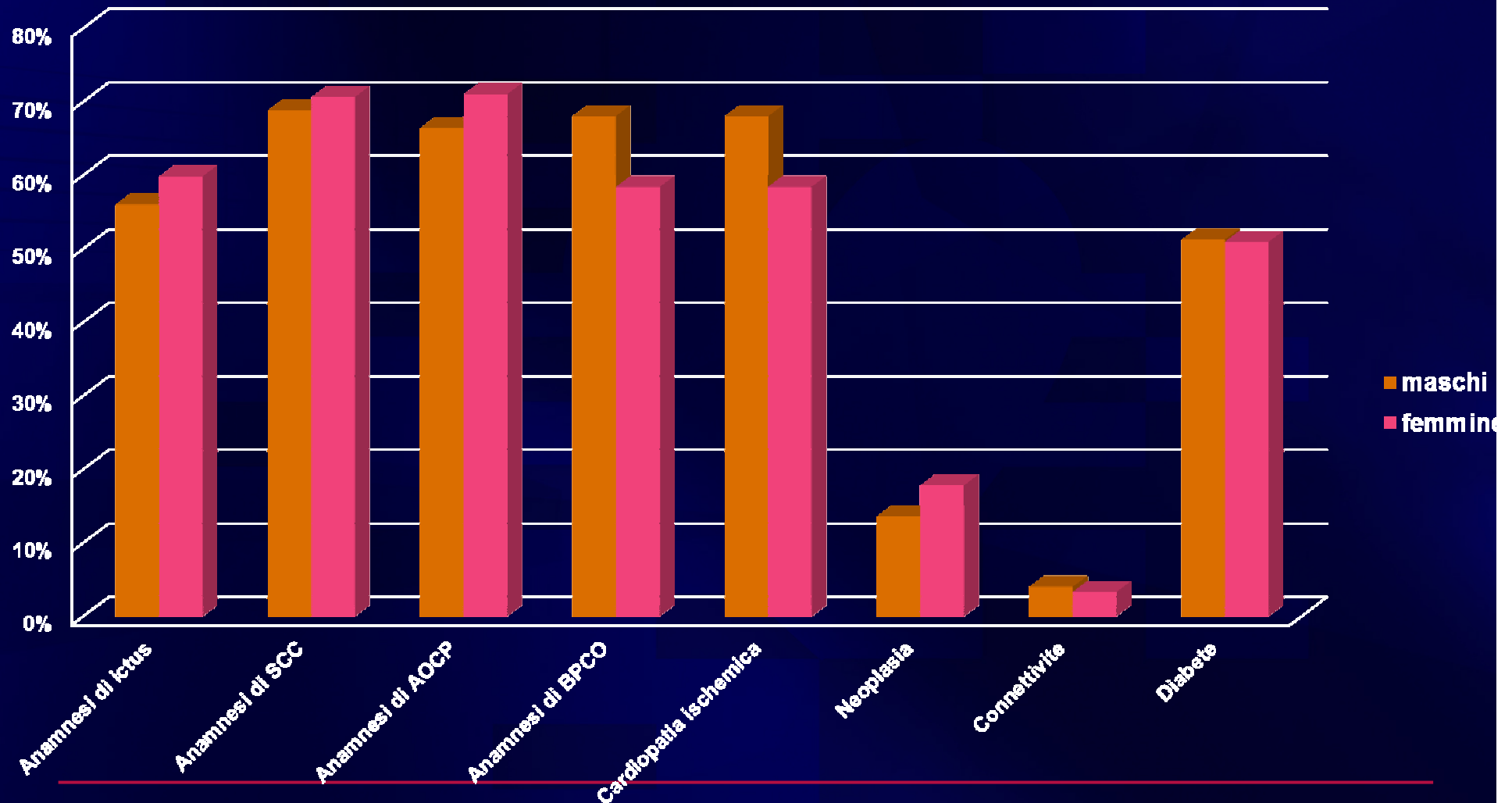


Anamnesi di ictus	58,40%	198 (58,4%)
Anamnesi di SCC	69,90%	237 (69,9%)
Anamnesi di AOCP	69,30%	235 (69,3%)
Anamnesi di BPCO	61,90%	210 (61,9%)
Cardiopatìa ischemica	61,90%	210 (61,9%)
Neoplasia	16,20%	55 (16,2%)
Connettivite	3,50%	12 (3,5%)
Diabete	51%	173 (51%)

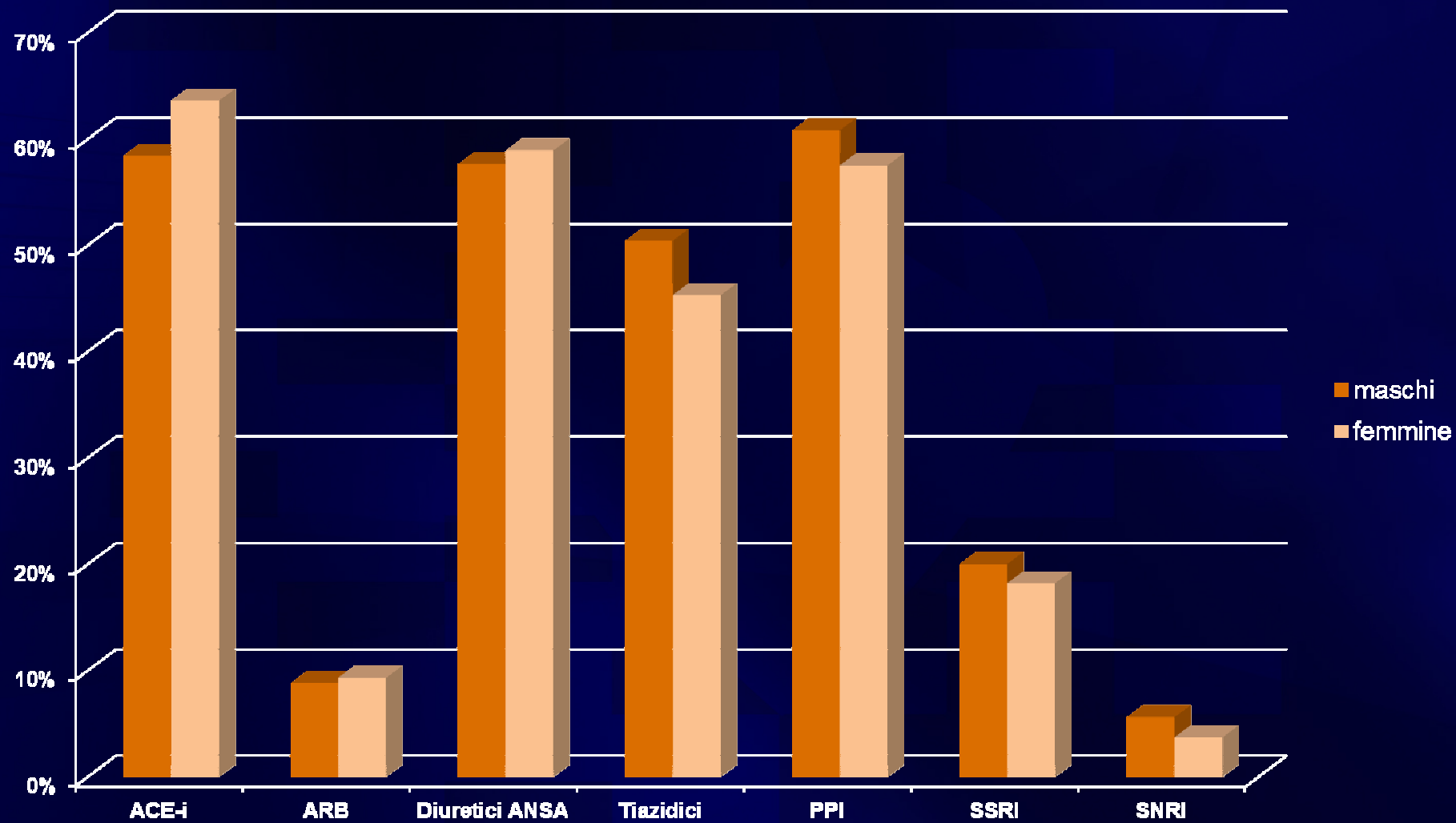
Multi-morbidità



Anamnesi



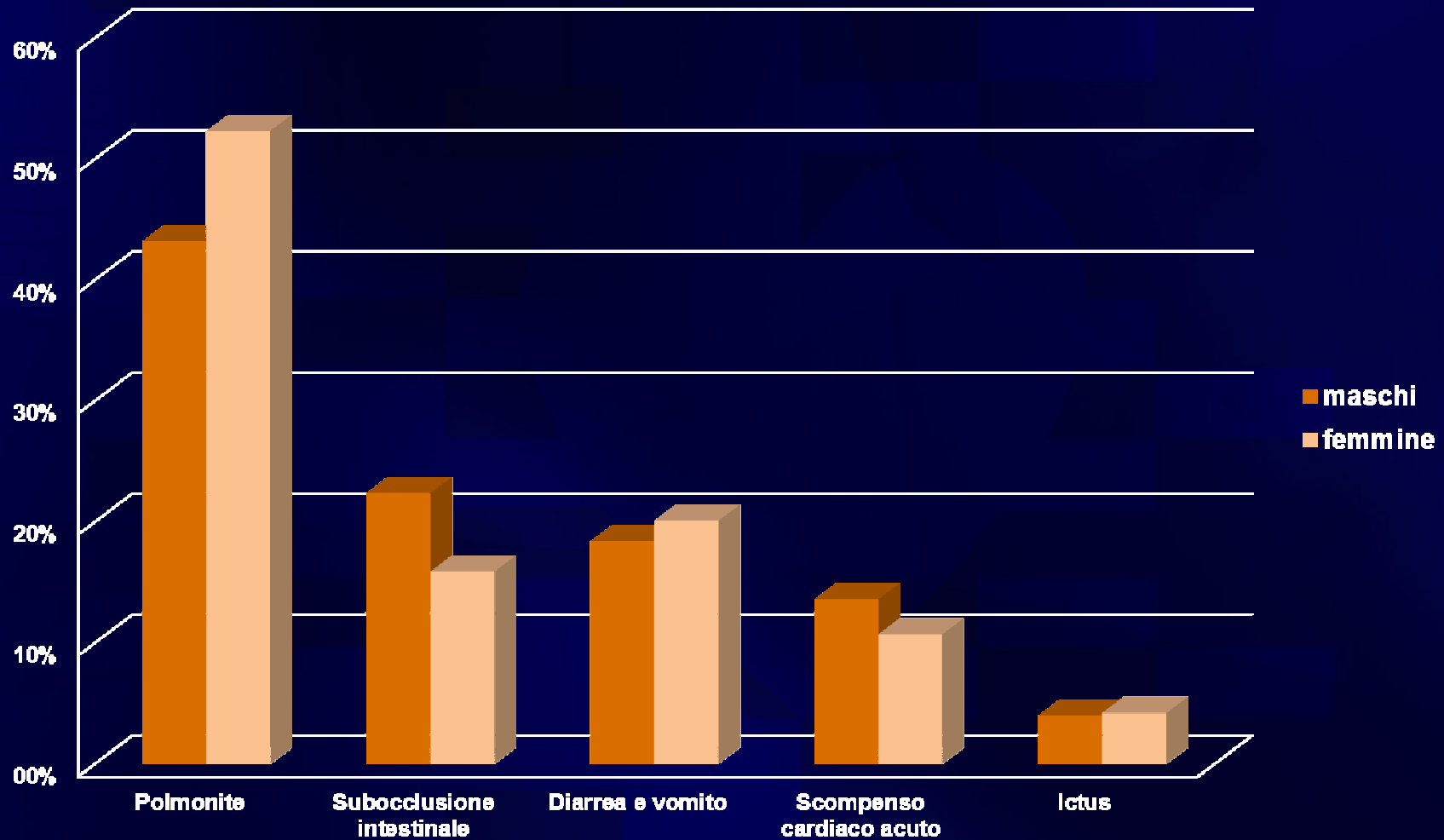
Terapia farmacologica all'ingresso



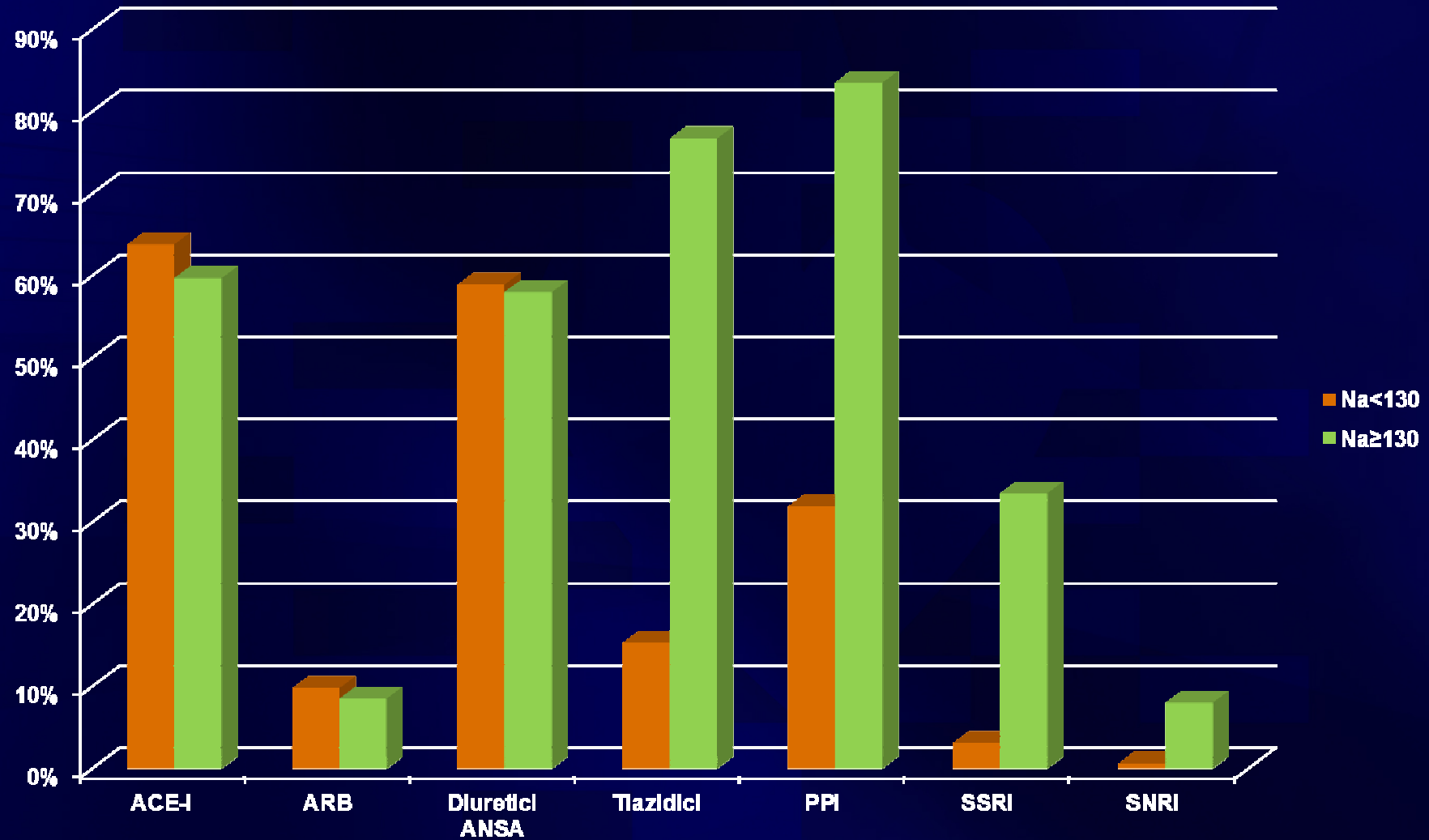
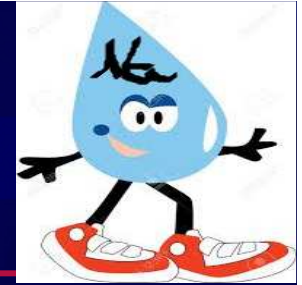
Iponatremia



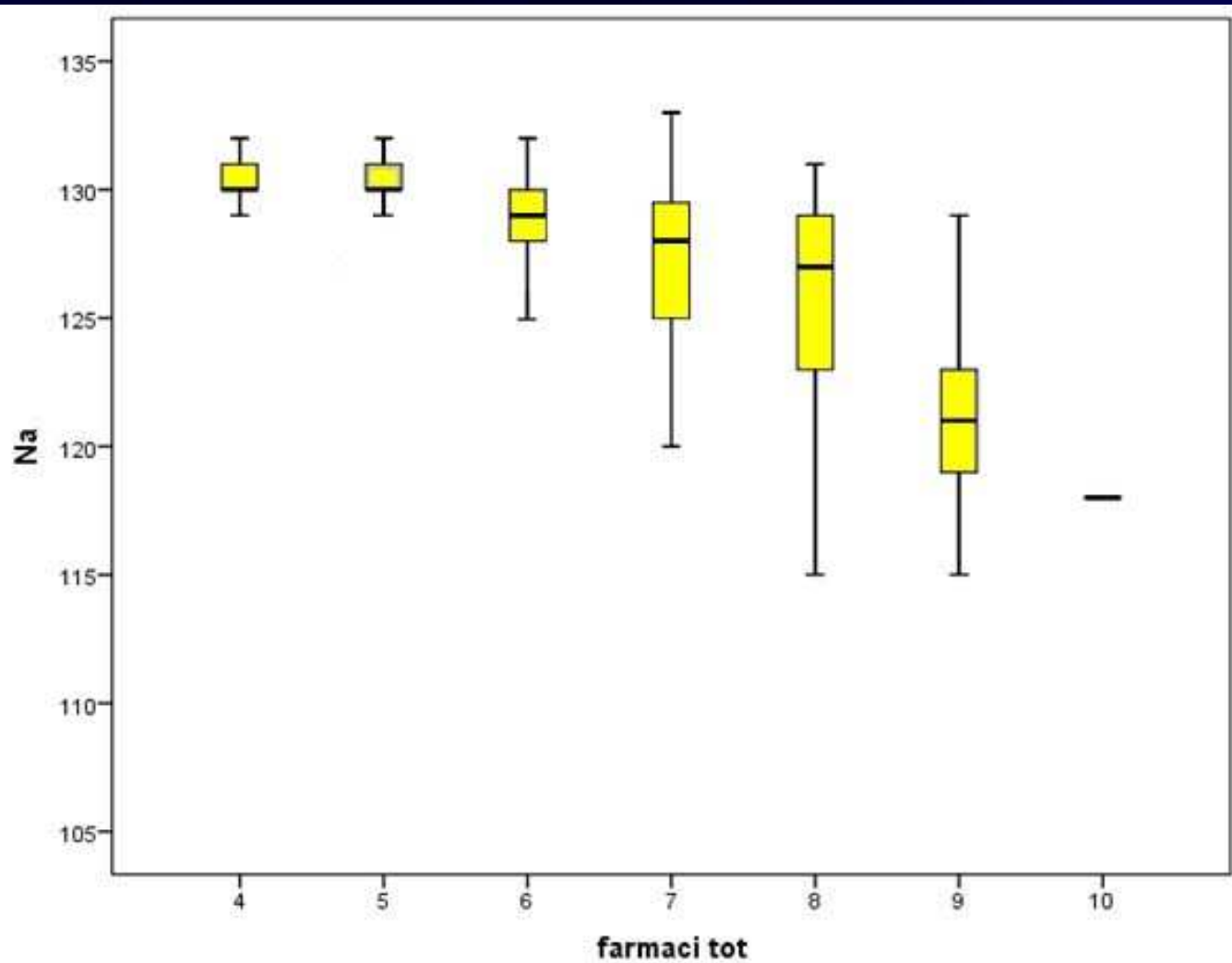
Cause di ingresso



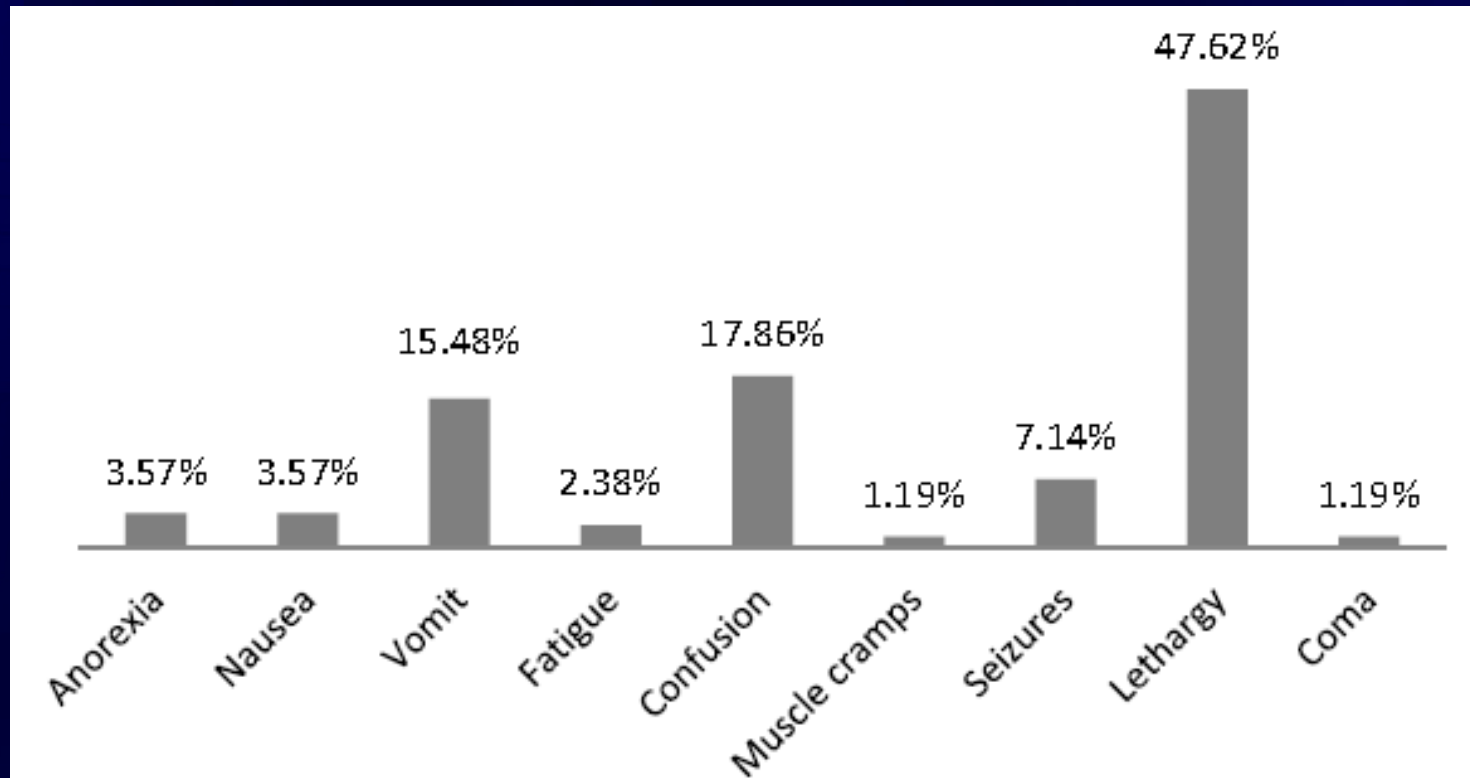
Iponatremia



Polifarmacoterapia e rischio di iponatremia



Manifestazioni cliniche



Meccanismi favorenti l'iponatremia



- Polifarmacoterapia
- Stato disidratazione-malnutrizione
- Età avanzata
- Comorbidity



Iponatremia e cadute



Contents lists available at ScienceDirect

Injury

journal homepage: www.elsevier.com/locate/injury



Hyponatremia as a fall predictor in a geriatric trauma population[☆]



Katelyn J. Rittenhouse **, Tuc To, Amelia Rogers, Daniel Wu, Michael Horst, Mathew Edavettal, Jo Ann Miller, Frederick B. Rogers *

LANCASTER General Health, Lancaster, PA, United States

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ABSTRACT

Introduction: Approximately one in three older adults fall each year, resulting in a significant proportion of geriatric traumatic injuries. In a hospital with a focus on geriatric fall prevention, we sought to characterize this population to develop targeted interventions. As mild hyponatremia, defined as a serum sodium <135 meq/L, has been reported to be associated with falls, unsteadiness and attention deficits, we hypothesized that hyponatremia is associated with falls in our geriatric trauma population. **Methods:** Gender, age, pre existing conditions (cardiac disease, diabetes, hematologic disorder, liver disease, malignancy, musculoskeletal disorder, neurological disorder, obesity, psychiatric disorder, pulmonary disease, renal disease, thyroid disease), mechanism of injury and admitting serum sodium level were queried for all geriatric trauma admissions from 2008 to 2011. Mechanism of injury was coded as falls admissions and non falls admissions. Admitting serum sodium levels were coded as hyponatremic (<135 mmol/L) and not hyponatremic (≥ 135 mmol/L).

Results: Of the 2370 geriatric trauma admissions during the study period, there were 1841 (77.7%) falls admissions and 293 (12.4%) patients who were hyponatremic. Gender, age, neurological disorder, hematologic disorder, and hyponatremia were found to be significant predictors of falls in both univariate and multivariable analyses.

Conclusion: Hyponatremic patients are significantly more likely to be admitted for a fall than non hyponatremic patients, when adjusting for age, neurological disorder, and hematologic disorder. Consequently, hyponatremia identification and management should be an integral part of any geriatric trauma fall prevention programme. Additionally, if hyponatremia is found during a geriatric fall workup, it should be corrected prior to discharge and closely monitored by a primary care physician to prevent recurrent episodes of falls.

Iponatremia e cadute



	Falls admissions % (N)	Non-falls admissions % (N)
Total	77.7 (1841)	22.3 (529)
Age		
65–74	23.1 (425)	43.1 (228)
75–84	39.3 (723)	43.5 (230)
≥85	37.6 (693)	13.4 (71)
Gender (N)		
Male	36.5 (671)	51.9 (275)
Female	63.6 (1170)	48.0 (254)
Admitting serum sodium		
≥135 mmol/L	86.3 (1588)	92.4 (489)
<135 mmol/L	13.7 (253)	7.6 (40)
Pre-existing conditions		
Cardiac disease	80.3 (1479)	78.3 (414)
Diabetes	26.8 (494)	26.5 (140)
Hematologic disorder	40.4 (744)	30.4 (161)
Liver disease	21.1 (388)	18.0 (95)
Musculoskeletal disorder	2.1 (39)	2.3 (12)
Neurological disorder	30.1 (554)	19.1 (101)
Obesity	4.5 (91)	6.3 (33)
Psychiatric disorder	19.3 (356)	15.3 (81)
Pulmonary disease	13.8 (254)	13.2 (70)
Renal disease	2.4 (45)	2.5 (13)
Thyroid disease	16.6 (305)	14.6 (77)
Median ISS (IQR)	9 (5–16)	9 (4–17)
Mortality	5.7 (105)	5.9 (31)

Hyponatremia e osteoporosi



ORIGINAL ARTICLE

Hyponatremia and osteoporosis: reappraisal of a novel association

F. Afshinnia¹ · B. Sundaram² · R. J. Ackermann³ · K. K. Wong^{3,4}

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Abstract

Summary Age was a modifier of the independent association between hyponatremia and osteoporosis (OP). Risk of OP was the highest in the youngest age group as compared to older patients. A longer duration of hyponatremia revealed a similar association with OP in all anatomical sites.

Introduction Epidemiologic studies provide conflicting results on the relationship between hyponatremia and OP. Our aim is to test the modification effect of age on the relationship between hyponatremia and OP at various anatomical sites in a large patient population.

Methods This is a cross-sectional observation of consecutive patients with available bone densitometry, demographic, clinical, and laboratory data from 2001 to 2013 at a single center. OP was defined as a bone mineral density of ≤ 2.5 standard deviations below the mean peak bone mass of young, healthy

adults. Hyponatremia was defined as serum sodium ≤ 135 mmol/L. Multiple logistic regressions were used to calculate adjusted odds ratio (OR).

Results Overall, 24,784 patients were included. There were 4549 males (18.4 %). Hyponatremia was present in 703 patients (2.8 %), femoral neck OP in 2603 (10.5 %), total hip OP in 1885 (7.5 %), and lumbar OP in 4830 (19.5 %). Total hip OP occurred in 17.6 % ($n=124$) of patients with hyponatremia as compared to 6.6 % ($n=880$) of patients with sodium level of "140–145" mmol/L ($P<0.001$). After multivariable adjustments, hyponatremia was associated with 2.46-fold higher odds of total hip OP (95 % CI, 1.36 to 4.46) in age <55 years, 1.96-fold (1.13 to 3.41) in age 55 to 67 years, and 1.55-fold (1.13 to 2.12) in age >67 years (age-sodium category interaction P value=0.002).

Conclusions Age appeared as a modifier of the independent association between hyponatremia and OP. Risk of OP was the highest in the youngest age group as compared to older patients.

Iponatremia e fratture da fragilità

Original Article

J Clin Med Res. 2015;7(1):45-51

Prognosis of Hyponatremia in Elderly Patients With Fragility Fractures

Kirsten Cumming^a, Stephen McKenzie^b, Graeme E. Hoyle^b, James D. Hutchison^a, Roy L. Soiza^{b, c}

Abstract

Background: Hyponatremia (serum sodium < 135 mmol/L) is the commonest electrolyte imbalance encountered in clinical practice. It is associated with multiple poor clinical outcomes including increased length of hospital stay, institutionalization and mortality. Prevalence of hyponatremia is higher in frail patient groups, and elderly patients with fragility fractures (EPFF) are particularly susceptible. This study aimed to establish the impact of hyponatremia on total length of inpatient stay (TLOS), need for inpatient rehabilitation and mortality in EPFF.

0.006). Factors independently associated with increased TLOS were age ($P=0.03$) and drop in sodium during admission ($P<0.001$). Mortality rate and proportion of participants discharged to inpatient rehabilitation were higher in the hyponatremic group (OR 4.2 (95% CI: 0.9 - 19.8) and 2.2 (95% CI: 0.9 - 5.1), respectively), but figures did not reach statistical significance.

Conclusions: Hyponatremia is highly prevalent in EPFF, seen in 33/127 cases (26%), and is associated with increased length of index hospital stay. Drop in serum sodium during admission was independently associated with increased TLOS.

Iponatremia e mortalità



INTERNAL MEDICINE JOURNAL



Hyponatraemia at hospital admission is a predictor of overall mortality

L. Balling,¹ F. Gustafsson,¹ J. P. Goetze,² M. Dalsgaard,³ H. Nielsen,⁴ S. Boesgaard,¹ M. Bay,⁵ V. Kirk,⁶ O. W. Nielsen,⁴ L. Køber¹ and K. Iversen³

Departments of Cardiology, and ²Clinical Biochemistry, Rigshospitalet, University Hospital of Copenhagen, ³Department of Cardiology, Bispebjerg Hospital, Copenhagen, ⁴Department of Cardiology, Frederiksberg Hospital, Frederiksberg, ⁵Department of Oncology, Herlev Hospital, Herlev and ⁶Department of Cardiology and Endocrinology, Hillerød Hospital, Hillerød, Denmark

Key words
hyponatraemia, all-cause mortality, electrolyte disturbance.

Correspondence
Louise Balling, Department of Cardiology, Rigshospitalet, University of Copenhagen, Blegdamsvej 9, Copenhagen, Denmark.
Email: louseballing@gmail.com

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Abstract

Background: Hyponatraemia is a prognostic marker of increased mortality and morbidity in selected groups of hospitalised patients. The aim of the present study was to examine the prevalence and prognostic significance of hyponatraemia at hospital admission in an unselected population with a broad spectrum of medical and surgical diagnoses.

Methods: Consecutive patients >40 years of age admitted to a general district hospital in Greater Copenhagen between 1 April 1998 and 31 March 1999. Median follow-up time was 5.16 years (range 0–4372 days). Plasma sodium measurements were available in 2960 patients, and hyponatraemia defined as $P-Na^+$ <137 mmol/L at hospital admission was present in 1105 (37.3 %) patients.

Results: One-year mortality was higher for hyponatraemic patients than for normonatremic patients: 27.5 % versus 17.7%. Moreover, hyponatraemia was an independent predictor of short and long-term all-cause mortality after 1 year and after the entire observation period respectively: hazard ratio (HR) 1.6 (95 % confidence interval (CI) 1.4–1.9, $P < 0.0001$) and HR 1.4 (95 % CI 1.3–1.6, $P < 0.0001$). Patients with hyponatraemia had longer hospitalisations than patients with normonatremia: 7.6 (± 0.38) days vs 5.6 (± 0.21) days, $P < 0.001$. There was no interaction between hyponatraemia at admission and any admission diagnoses ($P > 0.05$ for all interaction analyses).

Conclusion: Hyponatraemia is associated with increased all-cause mortality and longer admission length independently of diagnosis and clinical variables.

Iponatriemia e mortalità

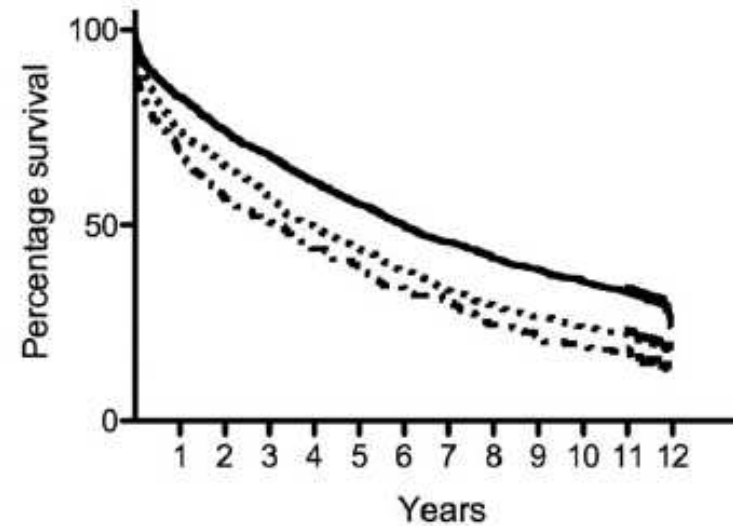


Figure 1 Kaplan-Meier plot illustrating mortality according to plasma sodium concentrations. (—), Normonatraemia; (---), mild hyponatraemia; (-·-·), moderate and severe hyponatraemia.

Conclusioni



- **L'iponatremia rappresenta il disordine elettrolitico più frequente nei pazienti anziani e ospedalizzati, ed è associato da un lato con un impatto prognostico sfavorevole, dall'altro con un importante consumo di risorse in relazione ad aumento dei tempi, dei costi dei degenza e riammissioni.**
- **L'approccio terapeutico deve tenere in considerazione i rischi della rapida correzione e delle interferenze farmacologiche.**
- **L'iponatriemia può essere considerata un marker di severa compromissione dello stato clinico e funzionale del paziente anziano ospedalizzato**

Grazie per l'attenzione !!

