Il fenomeno “Cadute” come marker di fragilità nel soggetto anziano: epidemiologia, impatto sanitario, screening e prevenzione.

Epidemiologia del fenomeno e impatto sul sistema ospedaliero.

Gianfranco Cervellin

U.O.C. Pronto Soccorso e Medicina d’Urgenza

Azienda Ospedaliero-Universitaria di Parma

- **È stato calcolato che più di 400,000 cadute fatali avvengano ogni anno nel mondo, rendendole la seconda causa di morte traumatica accidentale, preceduta solo dagli incidenti stradali.**
- **Anche quando non letali, le cadute sono associate con effetti negativi sulla salute, essendo causa del 20-30% di tutti i traumi moderati-severi, dalle lesioni dei tessuti molli alle fratture.**
- **Inoltre ogni caduta comporta pesanti conseguenze negative psicosociali, quali la riduzione dell'attività fisica – almeno in parte legata alla paura di ulteriori cadute – che risulta in un peggioramento globale della qualità di vita.**
- **Pertanto, anche quando non fatali nel breve periodo, le cadute sono spesso seguite da limitazioni funzionali, elevati costi sanitari, aumentata mortalità nel medio termine.**

- **Molti individui manifestano una aumentata tendenza alle cadute con l’invecchiamento.**
- **Ciò è attribuibile a svariate ragioni, inclusi: ridotta acuità visiva, instabilità/capogiro, malattie muscoloscheletriche, malnutritione, problemi nella marcia, parkinsonismo, deterioramento cognitivo.**
- **Va notato che i precisi meccanismo che portano a caduta rimangono sconosciuti nella grande maggioranza dei casi.**

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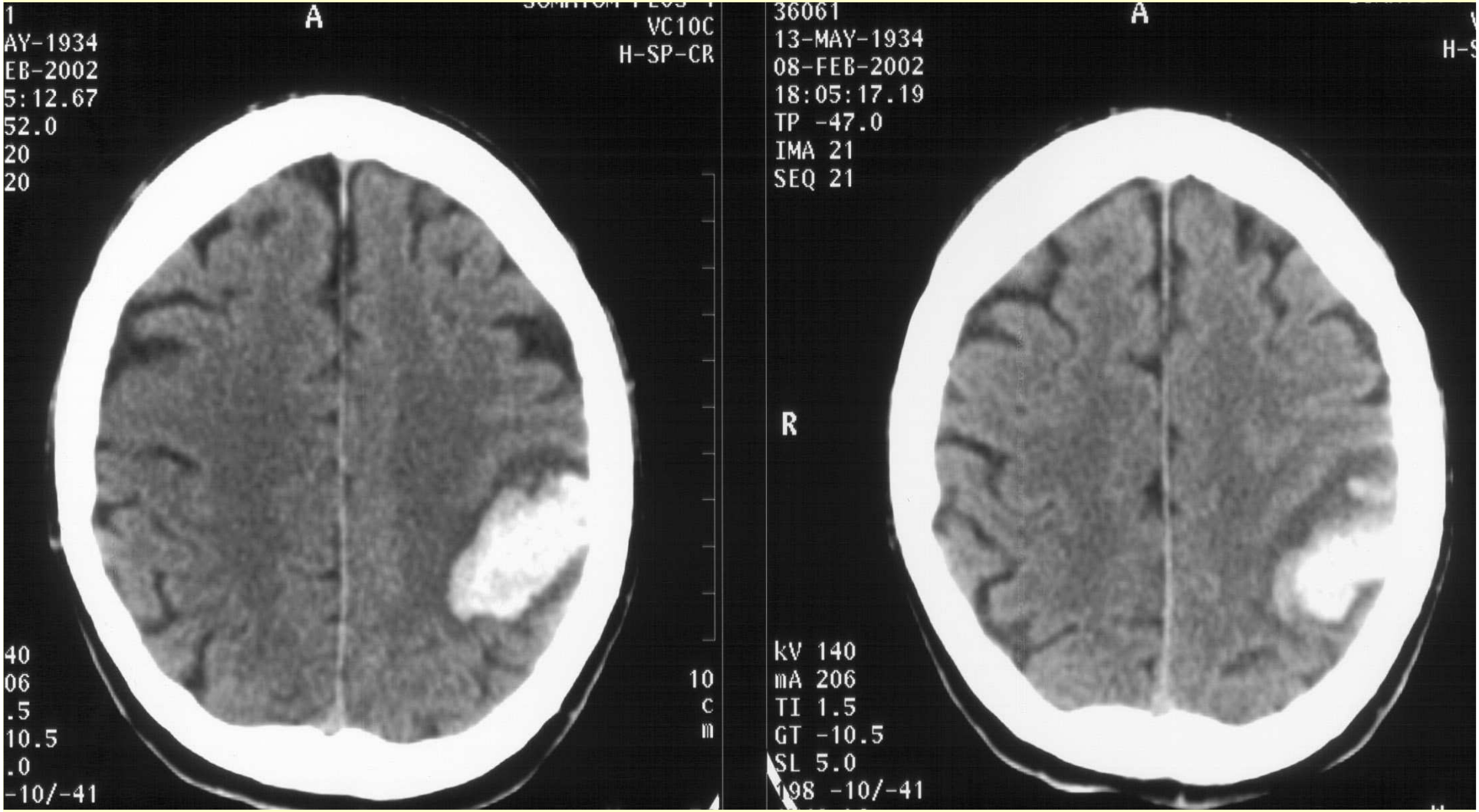
- **Va notato che i precisi meccanismo che portano a caduta rimangono sconosciuti nella grande maggioranza dei casi.**

Caso clinico

Metta qui una bella firmetta!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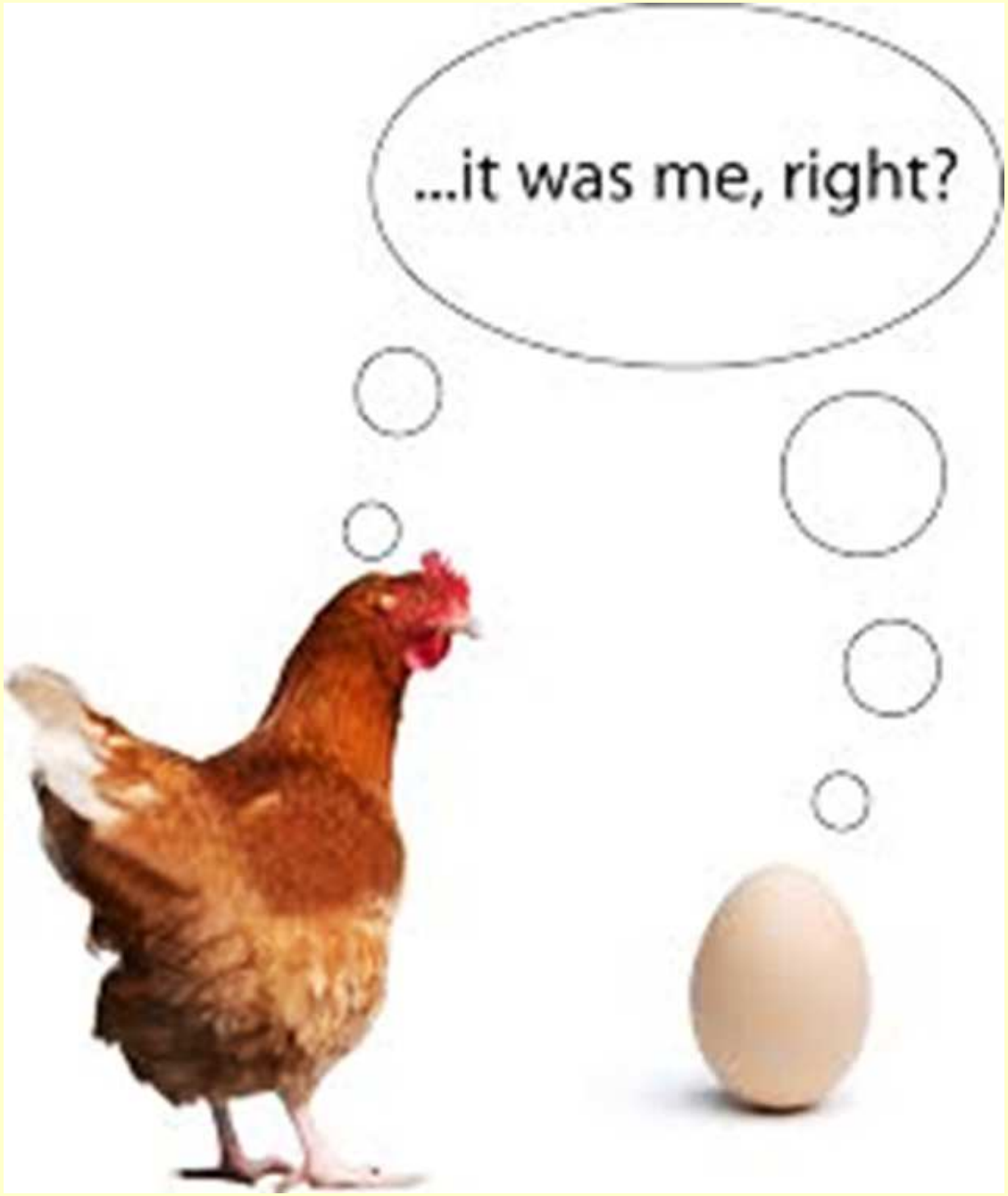
...it was me, right?

- Molti individui manifestano una aumentata tendenza alle cadute con l'invecchiamento.
- Ciò è attribuibile a svariate ragioni, inclusi: ridotta acuità visiva, instabilità/capogiro, malattie muscoloscheletriche, malnutritione, problemi nella marcia, parkinsonismo, deterioramento cognitivo.
- Va notato che I precisi meccanismo che portano a caduta rimangono sconosciuti nella grande maggioranza dei casi.
- **Inoltre, esiste una ampia sovrapposizione tra cadute e sincopi, il che rende una corretta diagnosi eziologica ancora più difficile.**

Europace (2014) **16**, 1379–1383
doi:10.1093/europace/eut402

Evaluation of the current prognostic role of heart diseases in the history of patients with syncope

Filippo Numeroso[1]*, Gianluigi Mossini[1], Giuseppe Lippi[2], and Gianfranco Cervellin[1]

[1]Emergency Department, University Hospital of Parma, via Gramsci 14, 43126 Parma, Italy; and [2]Department of Pathology and Laboratory Medicine, University Hospital of Parma, via Gramsci 14, 43126 Parma, Italy

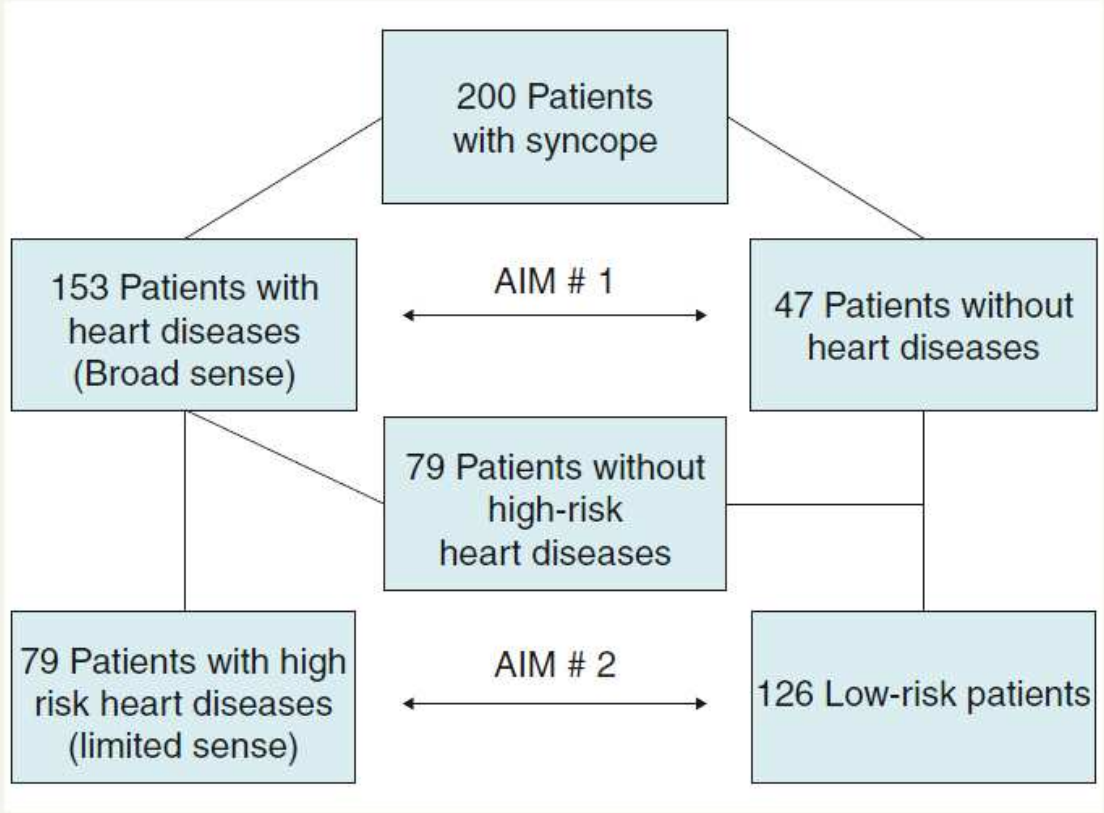

Figure 1 Study flow chart.

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Table 2 Patients' clinical features and the cumulative outcomes occurred during the follow-up

Patients *n*	200	
Gender	Male	97 (48.5%)
	Female	103 (51.5%)
Age	Years	72 ± 15
History	No heart diseases	47 (23.5%)
	Heart diseases (broad sense)	153 (76.5%)
Aetiological diagnosis	Neurally mediated	63 (31.5%)
	Orthostatic	48 (24%)
	Cardiovascular	51 (25.5%)
	Unexplained syncope or other causes of TLOC	38 (19%)
Outcomes	At 1 month	At 1 year
Recurrences	5 (2.5%)	30 (15%)
Major procedures	32 (16%)	40 (20%)
Cardiovascular events	8 (4%)	20 (10%)
Death for any reason	5 (2.5%)	15 (7.5%)

TLOC, transient loss of consciousness.

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Table 3 Serious events in patients with vs. without heart diseases (in the broad sense)

Outcome	Patients with heart diseases			Patients without heart diseases		
	Proportion	95% CI		Proportion	95% CI	
1 month	28%	21%	35%	15%	9%	20%
1 year	63%	55%	70%	31%	24%	39%

CI, confidence interval.

Ma quanto cadono?

Emergency Care Journal 2014; volume 10:4708

A multicenter retrospective study on falls in elderly population. Epidemiology and impact on hospital workload in two Emergency Departments of Northern Italy

Gianfranco Cervellin,[1] Francesca Montali,[2] Giovanna Campaniello,[2] Mario Benatti,[1] Roberto Fiorini,[3] Gianni Rastelli[3]

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- All the ED visits for domestic or trivial falls were retrieved from the database of the two EDs of Parma Province (about 447,000 inhabitants) during the year 2013, with exclusion of injuries related to sports, car accidents and all high-energy trauma.
- According to our study design, only patients aged ≥65 years were considered.
- All cases were then classified into groups, according to age (5-year ranges) and gender.
- The individual reports of the visits were analyzed separately to evaluate where and how the patient fell, the type of injury, the need for hospitalization and the ward of admission (i.e., Medicine/Geriatrics, Orthopedics, Neurosurgery).

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Table 1. Inhabitants aged ≥65 years of the Province of Parma, year 2013.

Age group (years)	Females		Males	
	N	%	N	%
65-69	12,623	21.7	11,580	27.1
70-74	12,964	22.3	11,101	26.0
75-79	11,141	19.2	8793	20.6
80-84	9679	16.7	6170	14.4
85-89	7369	12.7	3618	8.5
90-94	3293	5.7	1226	2.9
95-99	829	1.4	200	0.5
>100	166	0.3	30	0.1
Total	58,064	100.0	42,718	100.0

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We have analyzed:
i)the incidence rate of falls in all subjects;
ii)the incidence in relationship with age, also calculating the relative risk (RR);
iii)the burden of fall-related hospitalizations in the considered age groups.

The distribution of falls rate was analyzed with Pearson's χ^2 statistic, using Analyse-it (Analyse-it Software Ltd, Leeds, UK).

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- A total number of 129,898 ED visits was recorded during 2013, of whom 92,981 in the University Hospital, and 37,007 in the Community Hospital.
- Males accounted for 52.1% and females for 47.9% of the whole sample.
- According to gross age groups, patients aged <30 years accounted for 34.4%, those aged 31-60 years for 34.85, and those aged ≥61 years for 30.75% of the total.
- During the same study period, 3720 ED visits were related to domestic falls in patients aged ≥65 years (i.e., 2.9% of the total visits).
- In the same period, 828 patients aged ≥65 years, involved in sport accidents, car accidents and high-energy trauma have been excluded.

A multicenter retrospective study on falls in elderly population. Epidemiology and impact on hospital workload in two Emergency Departments of Northern Italy

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- As many as 2533 visits were made in the University Hospital, and 1187 in the Community Hospital.
- 3300 patients were visited for a fall only once, whereas 183 patients were visited twice, 15 patients three times, 1 patient four times and 1 patient five times.
- Accordingly, the two EDs recorded 3720 visits for 3500 patients.
- Overall, females accounted for 2648 visits (71.2%) and males for 1072 (28.8%), respectively.

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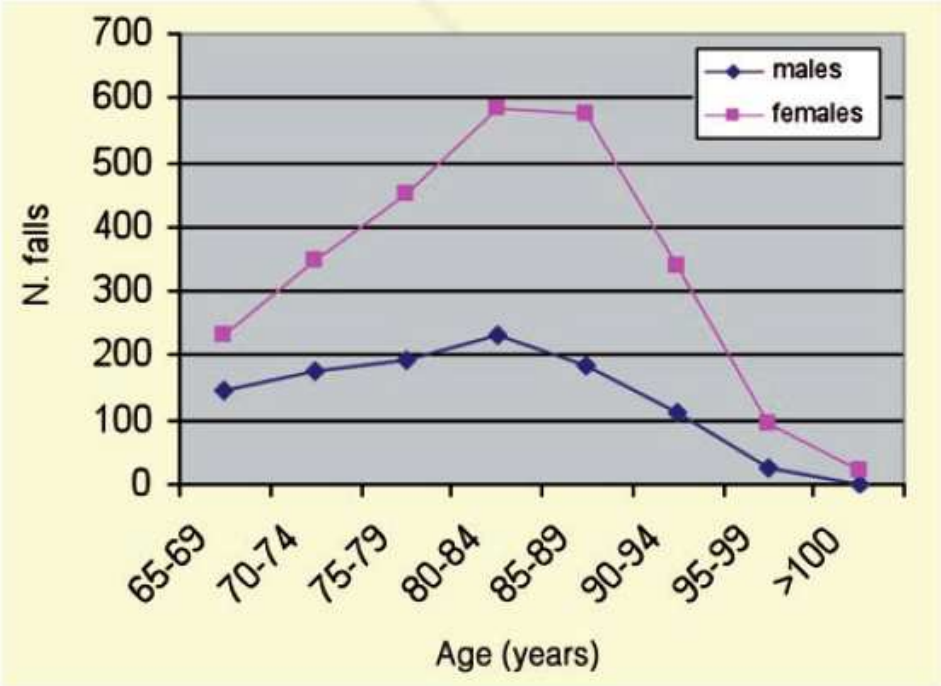

Figure 1. Absolute number of Emergency Department visits due to falls in 2013.

A multicenter retrospective study on falls in elderly population. Epidemiology and impact on hospital workload in two Emergency Departments of Northern Italy

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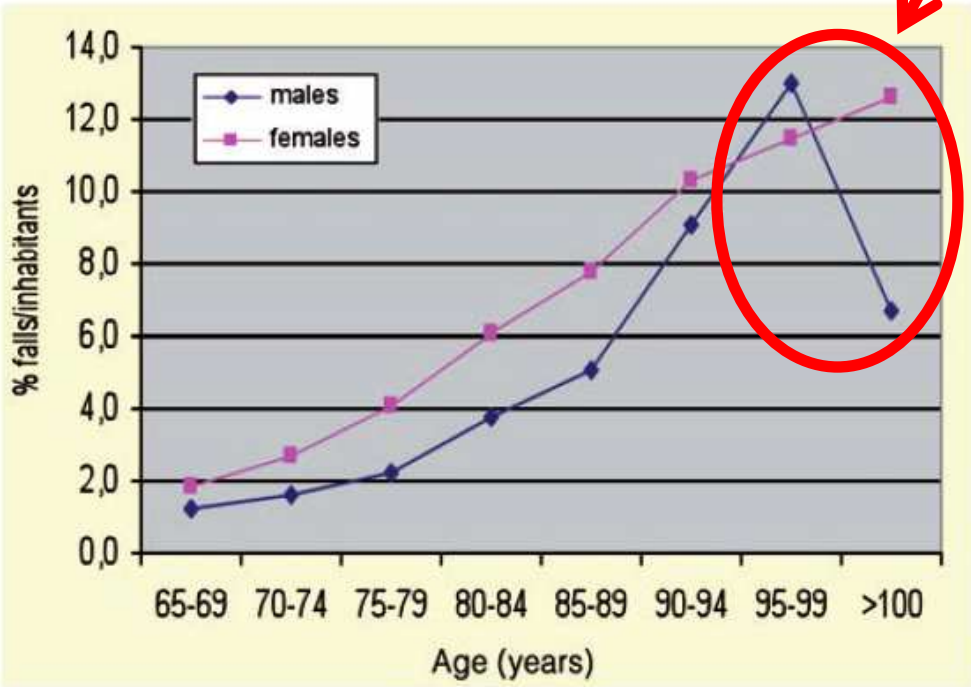

Figure 2. Number of Emergency Department visits due to falls in 2013, divided per number of inhabitants of the same age group.

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Table 2. Number of old patients visited due to falls in 2013, divided by age and gender.

Age group (years)	Females		Males	
	Absolute number	For % of inhabitants	Absolute number	For % of inhabitants
65-69	232	0.018	144	0.012
70-74	347	0.027	177	0.016
75-79	452	0.041	194	0.022
80-84	586	0.061	234	0.038
85-89	575	0.078	184	0.051
90-94	340	0.103	111	0.091
95-99	95	0.115	26	0.130
>100	21	0.127	2	0.067
Total	2648		1072	

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- **The RR of falls comparing the age range with the highest prevalence (>100 yrs in females and 95-99 yrs in males, respectively) with the age range exhibiting the lowest prevalence (65-69 yrs in both genders) was 6.9 (95% CI, 4.5 to 10.5; P<0.001) in females and 10.4 (95% CI, 7.1 to 15.5; P<0.001) in males, respectively.**

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A total number of 963 (i.e., 25.9%) of patients needed to be hospitalized:
•605 in Orthopaedic ward due to fractures (9.9% for femur neck fractures);
•342 in Medical wards (including Geriatrics, Cardiology, and Neurology) due to non-surgical brain injury, abdominal or chest trauma, or comorbidity;
•10 in the Neurosurgical unit for an acute subdural hematoma;
•2 in the Maxillo-facial Surgery for severe facial injuries;
•2 in the Thoracic Surgery for severe chest trauma;
•2 in the Intensive Care Unit for multiple severe injuries.

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Conclusions (1):

•the falls represent an important cause of morbidity in the elderly population, representing up to 2.9% of the whole ED workload, and up to 13.3% of the visits for patients aged ≥65.
•the hospital workload induced by falls is globally impressive, roughly corresponding to the whole activity of a medical or orthopaedic ward, in terms of number of admitted patients per year.

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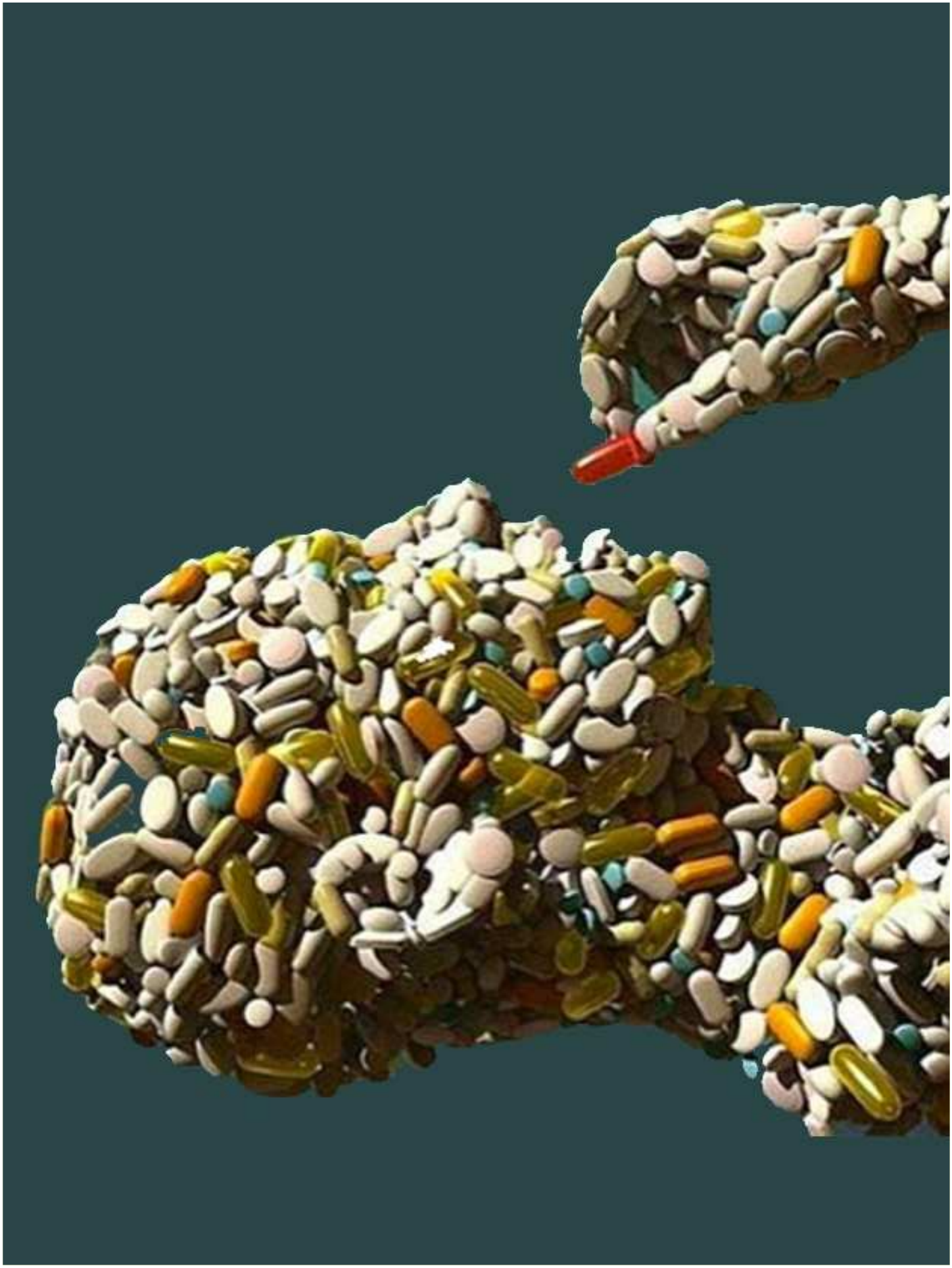
Conclusions (2):

•An Italian study has estimated an average cost of € 5479.09 for fall-related hospitalization in patients aged ≥75 years;
•According to data provided by this investigation, the overall cost burden of hospitalizing patients for falls in our two hospitals could hence be estimated at € 5,276,363.67 for 2013.



- **Nonostante un considerevole numero di difficoltà metodologiche riscontrate nello stabilire questo tipo di associazione, alcune classi di farmaci sono state associate al rischio di cadute, in particolare: analgesici narcotici, farmaci psicotropi, antiipertensivi, antidiabetici, e "polifarmacia" (→ più di quattro farmaci).**
- **Inoltre le cadute nei pazienti scoagulati sono state associate con una maggior mortalità, specialmente se vengono assunti anche altri farmaci classificati ad alto rischio di caduta (→ un farmaco aumenta il rischio caduta, l'anticoagulante il rischio di evento grave).**

Journal of Clinical Gerontology & Geriatrics 6 (2015) 63–67

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- **Data on all the ED visits during the year 2013 for domestic or trivial falls were retrieved from the database of the ED of the Academic Hospital of Parma, with exclusion of injuries related to sports, car accidents, and all high-energy trauma**
- **For the purposes of this study, the injuries were classified into a simplified model as follows: (1) hip fractures; (2) traumatic brain injury; (3) others, including minor fractures, contusions, and skin abrasions and lacerations.**

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~50%

- **A total of 93,029 ED visits were recorded during the year 2013.**
- **During the study period, 2533 visits were related to trivial falls in 2377 patients aged 65 years or older (i.e., 2.7% of the total visits), occurring at home or in nursing home.**
- **During the same period, 2229 patients (87.4%) visited the ED for a fall only once, whereas 139 patients visited two times (5.5%), eight patients three times (0.3%), and one patient four times.**
- **Accordingly, the ED recorded 2533 visits for 2377 patients.**
- **For 1280 cases, a thorough drug therapy history was available.**

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- **Overall, female patients accounted for 1843 visits (72.8%) and male patients accounted for 690 visits (27.2%), respectively**
- **A total number of 756 (i.e., 28.1%) patients needed hospitalization, 463 of whom the orthopedic ward, and 277 to the medical wards (including geriatrics, cardiology, and neurology) due to nonsurgical brain injury, abdominal or chest trauma, or comorbidity. 10 patients were admitted to the neurosurgical unit for acute subdural hematoma; 2 patients to the maxillofacial surgery unit for severe facial injuries, 2 patients to the thoracic surgery unit for severe chest trauma, 2 to the intensive care unit for multiple severe injuries.**
- **Eight patients (1.1%) fell once more during the hospital stay.**

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Table 1
Demographic characteristics and types of fall-related injuries.

Demographic characteristics and type of injury	*N*	%
Female patients	1843	72.8
Male patients	690	27.2
Traumatic brain injury	453	19.1
Hip fracture	371	15.6
Others	1896	79.8
Needing hospital admission	756	28.1
Total patients	2377	100.0

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- **Overall, more than half (n = 1458; 61.3%) of the patients in ED for a trivial fall reported a severe injury (i.e., a fracture, a brain injury, a chest trauma, a multiple trauma).**
- **Among these 19.1% (n = 453) and 15.6% (n = 371) had a traumatic brain injury and a femur neck fracture, respectively.**
- **Only one patient died while in ED.**
- **Female sex was associated with more severe fall related injuries ($\chi^2 = 13.653$; $p < 0.0001$).**
- **Age also has shown to be a significant risk factor for severe injury, with a significant positive correlation between age and severity of injury (Pearson $r = 0.128$; $p < 0.001$).**

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- **The patients were taking an average of 3.3 drugs (range, 1-14; SD = 2.6);**
- **17.4% of the total patients were taking four or more different drugs;**
- **The drugs detected are classified as follows: antihypertensives (41.4%), antiplatelets (21.1%), psychotropic drugs (15.8%), anticoagulant drugs (12.2%), PPIs (9.5%), statins (5.7%), antidiabetic agents (4.6%), thyroid/antithyroid drugs (3.1%), nitroderivatives (2.5%), osteoporosis medications (1.9%), narcotic analgesics (1.6%), anticonvulsants (1.4%), and miscellaneous agents (13.9%).**

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Table 2
Total number of medications assumed by people aged 65 years and older.

Drugs currently taken by patients	*N*	%
1	458	18.1
2	135	5.3
3	129	5.1
4	131	5.2
5	94	3.7
6	64	2.5
7	57	2.3
8	31	1.2
9	34	1.3
10	11	0.4
11	10	0.4
12	5	0.2
13	2	0.1
14	2	0.1
Unquantified drug therapy	117	4.6
Drug therapy not detected	1253	49.5
Total	2533	100.0

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Table 3
Classes of drugs taken by the patients.

Drugs	*N*	% [a]
Antihypertensives		
ACE inhibitors	326	12.9
Diuretics	264	10.4
Beta-blockers	194	7.7
Calcium-channel blockers	145	5.7
Other antihypertensive	119	4.7
Psychotropic drugs		
Antidepressants	178	7.0
Benzodiazepines	149	5.9
Antipsychotics	74	2.9
Antiplatelets drugs		
Aspirin	436	17.2
Clopidogrel	84	3.3
Other antiplatelets	16	0.6
Anticoagulant drugs		
Oral anticoagulants (VKA)	275	10.9
Enoxaparin	32	1.3
Antiarrhythmics	55	2.2
Proton-pump inhibitors	240	9.5
Statins	144	5.7
Antidiabetic agents	117	4.6
Thyroid drugs	79	3.1
Nitroderivatives	63	2.5
Osteoporosis medications	49	1.9
Narcotic analgesics	40	1.6
Anticonvulsants	36	1.4
Miscellaneous agents	353	13.9
Total [a]	2533	100

ACE = angiotensin-converting enzyme; VKA = vitamin K antagonists.
[a] 2533 refers to the number of patients, not to the number of falls-related visits.

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- **We found a significant positive correlation between age and total number of drugs (Pearson r = 0.063; p<0.03).**
- **However, we found no correlation between the number of ED visits for trivial falls and the number of drugs in history (Pearson r = 0.001; p = 0.984).**
- **The χ_2 test indicated that the cutoff of four drugs was not related to any severe outcome considered (hospital admission, brain injury, and hip fracture).**

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- **Three drug classes were identified as predictors of hospital admission in the logistic regression analysis: anticoagulants (OR, 1.59; 95% CI, 1.22-2.07), antiplatelets (OR, 1.41; 95% CI, 1.12-1.79), and narcotic analgesics (OR, 2.38; 95% CI, 1.23-4.62);**
- **Four drug classes were identified as predictors of traumatic brain injury in the logistic regression analysis: antiplatelets (OR, 2.02; 95% CI, 1.56-2.62), anticoagulants (OR, 1.89; 95% CI, 1.141-2.55), antihypertensive (OR, 1.44; 95% CI, 1.08-1.93), and psychotropic drugs (OR, 1.93; 95% CI, 1.09-3.44;**
- **No drug was found to be a significant predictor of hip fracture.**

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Table 4
Relation between drugs use and hospital admission.

Drugs use, *N* (%)		Outcome: Hospital admissions				
		Falls leading to hospital admission ($n = 712$)	Falls not leading to hospital admission ($n = 1821$)	p	Adjusted OR	95% CI
		N (%)	*N* (%)			
Anticoagulants	Yes	116 (16.3)	191 (10.5)	0.001	1.592	1.224–2.070
	No	596 (83.7)	1630 (89.5)			
Antiplatelets drugs	Yes	178 (25.0)	335 (18.4)	0.004	1.411	1.115–1.786
	No	534 (75.0)	1486 (81.6)			
Narcotic analgesics	Yes	21 (2.9)	19 (1.0)	0.010	2.379	1.225–4.618
	No	691 (97.1)	1802 (99)			

CI = confidence interval; OR = odds ratio.

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Table 5
Relation between drugs use and traumatic brain injuries.

Drugs, *N* (%)		Outcome: Traumatic brain injuries				
		Brain injury ($n = 453$)	Other ($n = 2080$)	p	Adjusted OR	95% CI
		N	*N*			
Antiplatelets drugs	Yes	143 (31.6)	370 (17.8)	0.000	1.941	1.498–2.516
	No	310 (68.4)	1710 (82.2)			
Anticoagulants	Yes	76 (16.8)	231 (11.1)	0.000	1.794	1.329–2.421
	No	377 (83.2)	1849 (88.9)			
Antihypertensive	Yes	147 (32.5)	423 (20.3)	0.011	1.453	1.088–1.942
	No	306 (67.5)	1657 (79.7)			
Psychotropic drugs	Yes	81 (17.9)	226 (10.9)	0.041	1.404	1.014–1.942
	No	372 (82.1)	1854 (89.1)			

CI = confidence interval; OR = odds ratio.

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Conclusions (1):

- **In contrast to previous studies, we failed to find a significant correlation between the number of ED visits for trivial falls and the number of drugs in history.**
- **Moreover, the cutoff of four drugs seems to be unrelated with any severe outcome considered (i.e., hospital admission, brain injury, and hip fracture) in our study population.**

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Conclusions (2):

- **Considering the social and economic burden of such a high rate of hospitalization for falls, preventive strategies should be planned to improve gait ability through exercise programs, general and bone health through adequate dietary programs and drug delivery.**
- **In particular, a major focus should be placed on optimization of antihypertensives, narcotic analgesics, and psychotropic drugs administration, to minimize the risk of falls.**
- **Moreover, the risk-to-benefit ratio of anticoagulants and antiplatelet drugs should be individually tailored to optimize the advantages of the therapeutic choices.**

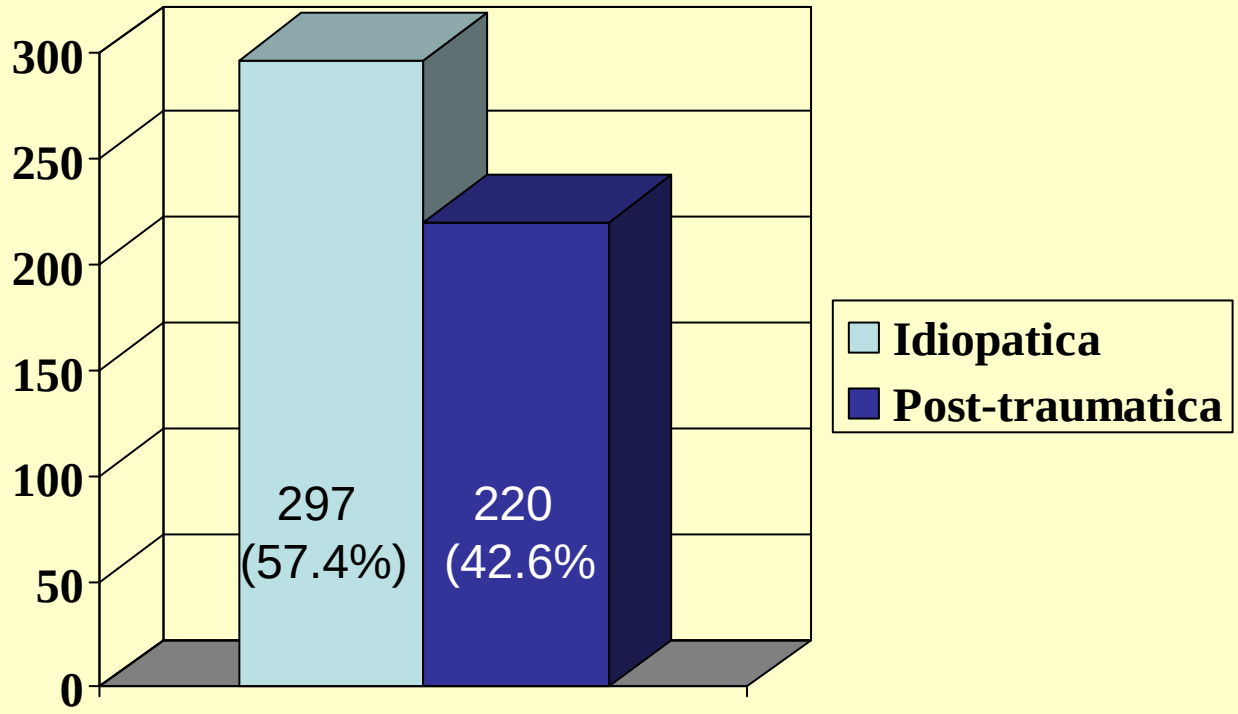
I pazienti scoagulati

STUDIO PROMPT-1
EMORRAGIA CEREBRALE NEI PAZIENTI IN TERAPIA CON AVK: REGISTRO PROSPETTICO MULTICENTRICO
RISULTATI PRELIMINARI

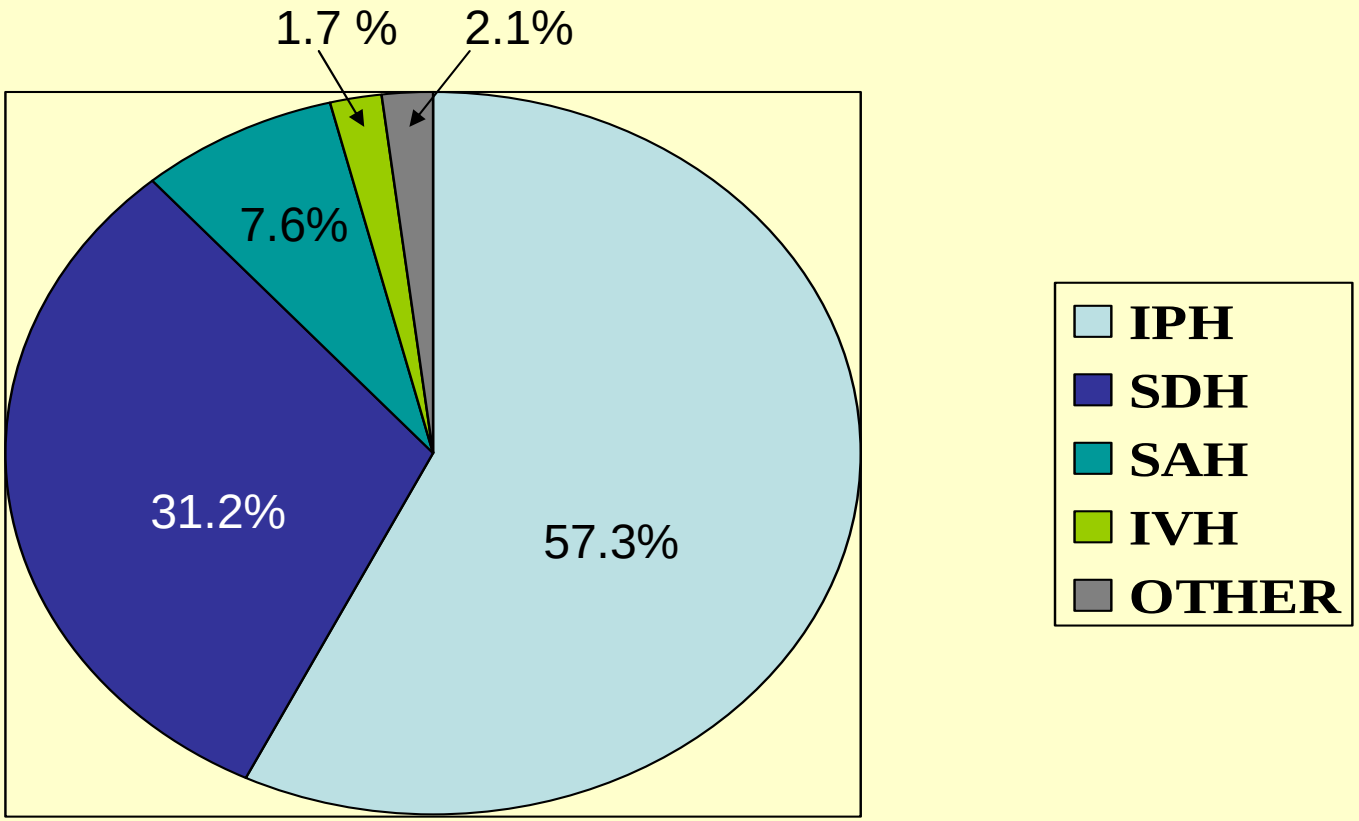
Gruppo di lavoro intersocietario SISET-SIMEU
Dott. Davide Imberti-Prof.Gualtiero Palareti (SISET)
Dott. Gianfranco Cervellin-Dott.sa Annamaria Ferrari (SIMEU)

Coordinatore: Dott. Davide Imberti
CENTRO EMOSTASI E TROMBOSI
UNITA' OPERATIVA MEDICINA INTERNA
Ospedale di Piacenza

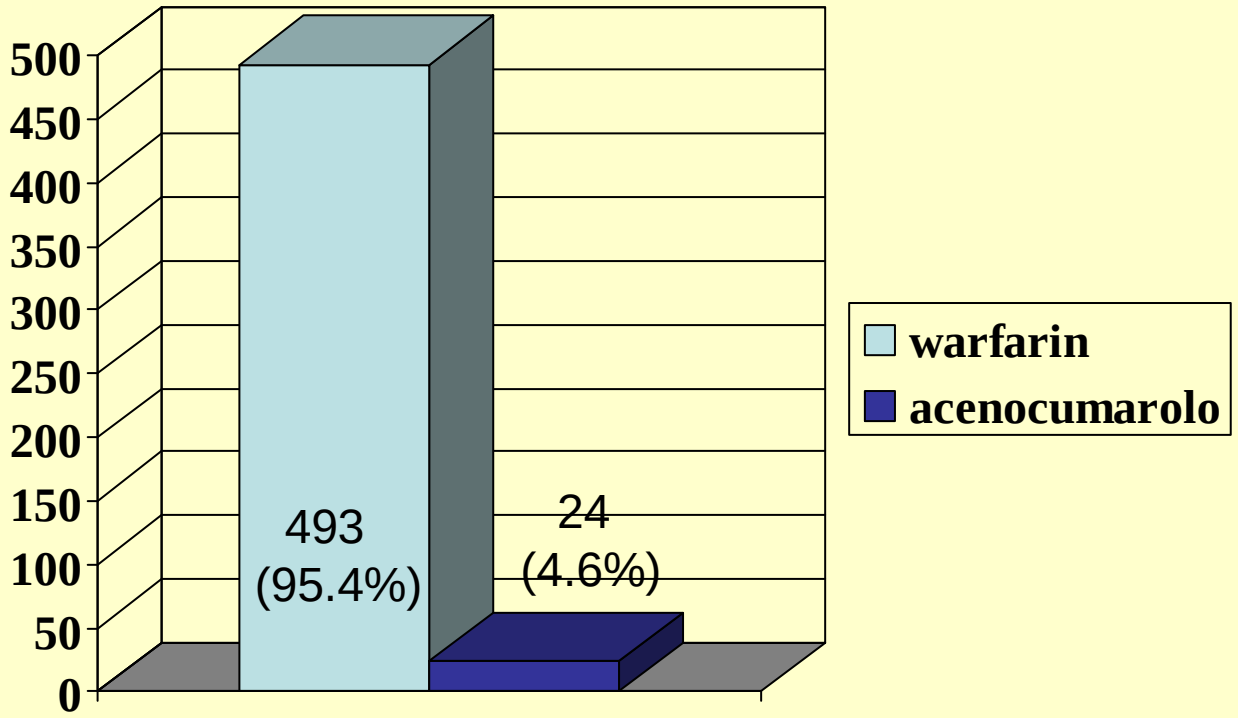
Emorragia: tipo



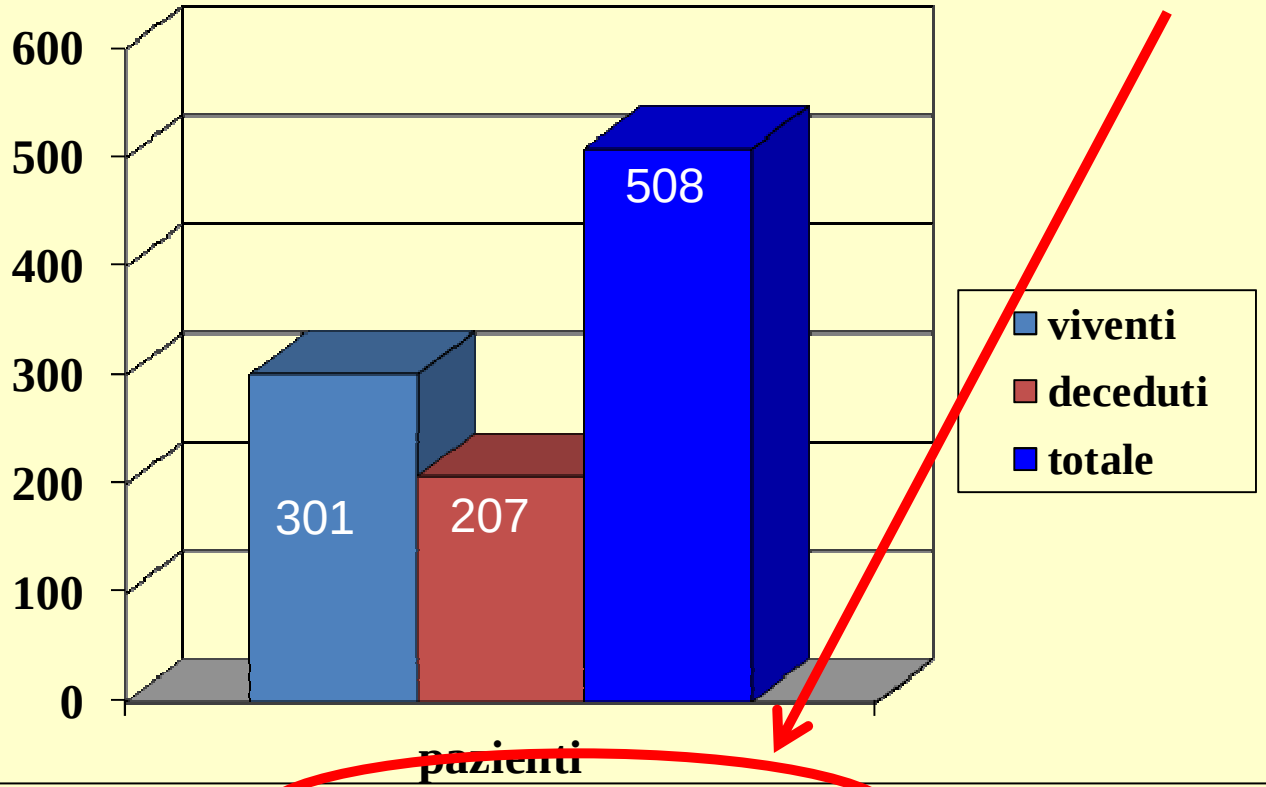
Emorragia: sede



AVK: tipo


500
450
400
350
300
250
200
150
100
50
0
493
(95.4%)
24
(4.6%)
warfarin
acenocumarolo

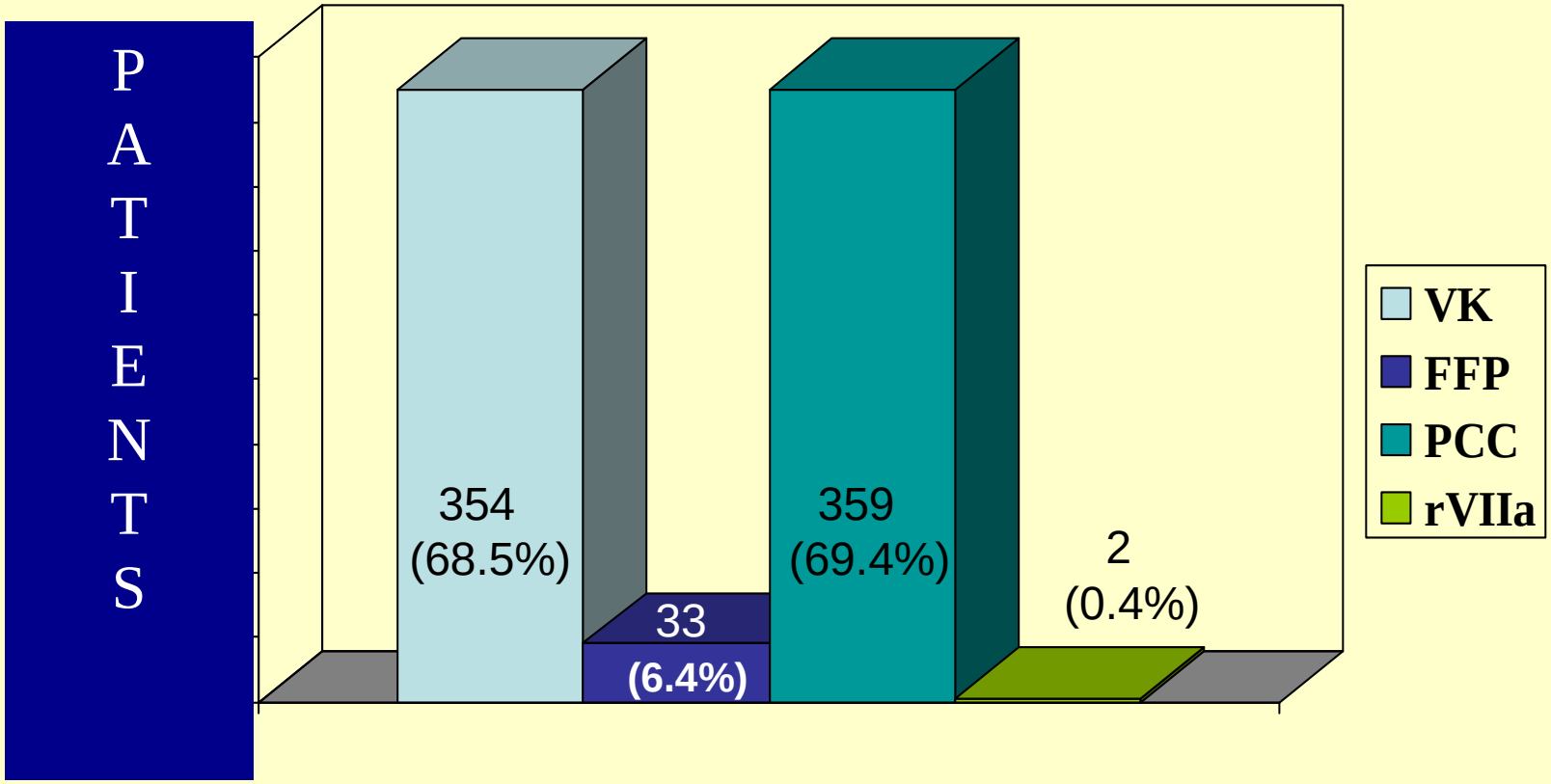
End-point primario (mortalità a 90 giorni)



MORTALITA' A 90 GIORNI: 40.7% (207/508 *, **)

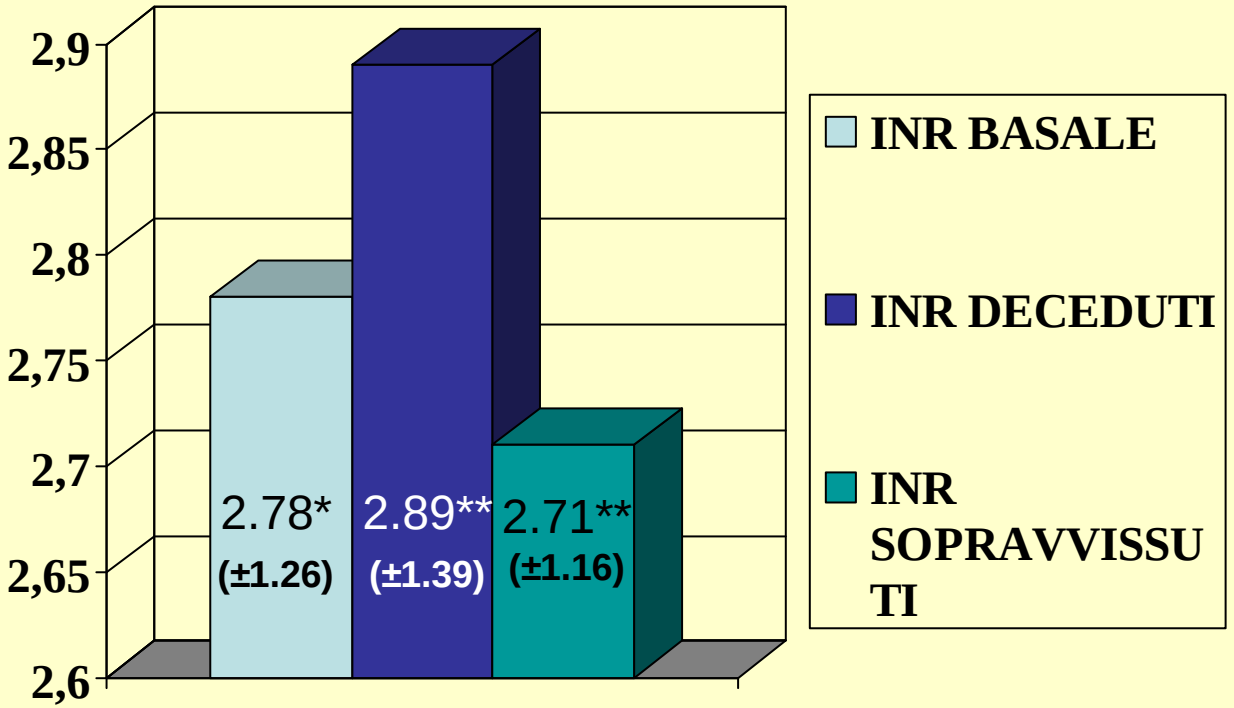
*** 508/517 con FU a 90 giorni; 9 pazienti (1.7%) persi al F.U.**
**** 27/207 (13%) deceduti dopo la dimissione**

Terapie emostatiche praticate



517 patients

INR basale



* INR basale range 0.9 - 13; ** P = 0.106

Fattori predittivi di mortalità: analisi multivariata

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	281,938[a]	,000	0	.
INR_quintili	301,246	19,307	5	,002
sesso1F2M	282,268	,330	1	,566
fasce_età	285,899	3,960	1	,047
mese	296,224	14,286	11	,218
stagione	284,916	2,978	3	,395
oraarrivo	315,561	33,623	23	,071
INFUSIONEVITAMINAK1no2si5mgev3si10mgev4s	287,933	5,994	3	,112
INFUSIONEPFC1no2si1520mlkg3si20mlkg4si	285,987	4,049	3	,256
INFUSIONECPP1no2siCPP3fattori3siCPP4fattori	286,689	4,751	2	,093

- INR basale in quintili (0-1 = 1; 1-2 = 2; 2-3 = 3; 3-4 = 4; > 4 = 5)
- Fasce eta': (< 80 anni; ≥ 80 anni)

Conclusioni

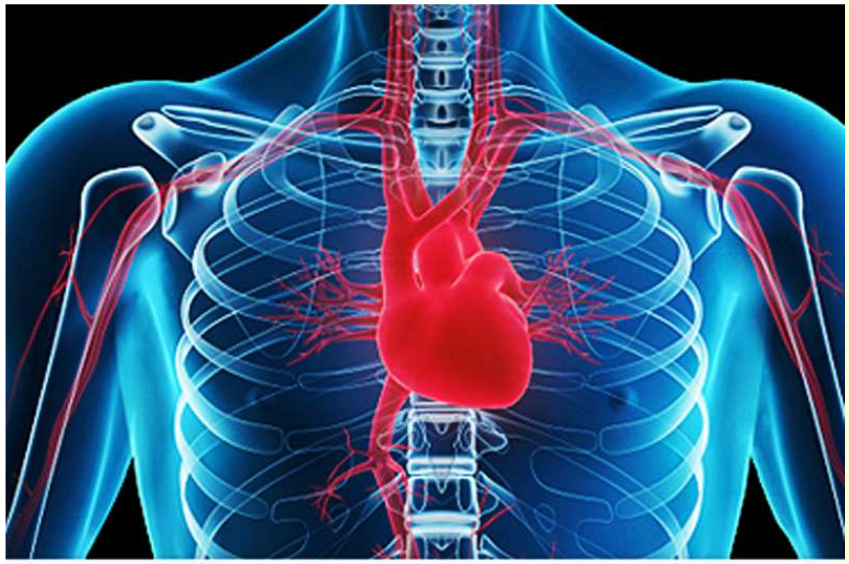
• La mortalità a tre mesi nei pazienti con EIC durante TAO è elevata (40.7%)

• I parametri predittivi di mortalità sono stati l'INR basale elevato, eta' > 80 a, GCS ≤ 8, intervento chirurgico, sede IP

• La somministrazione di PCC si è dimostrata un valore predittivo di sopravvivenza

• I presidi terapeutici più impiegati sono stati la Vitamina K (68.5%) e i PCC (69.4%)

• I PCC più usati sono stati quelli a tre fattori (94.1%), a dosaggio variabile, in base all'INR basale e al peso del paziente (79.1%)



Gioia del cardiologo,
tormento del medico d’urgenza!


Questions?