SOCIETÀ ITALIANA DI GERONTOLOGIA E GERIATRIA

GIOG

ASSOCIAZIONE ITALIANA PSICOGERIATRIA

L'Ortogeriatria: una sfida per il presente, un'opportunità per il futuro
Orthogeriatrics: a challenge for the present, an opportunity for the future

I problemi clinici in ortogeriatria / The clinical problems in Orthogeriatrics

Giuseppe Bellelli

Clinica Geriatrica, Università Milano-Bicocca

Gruppo di Ricerca Geriatrica, Brescia

UNIVERSITÀ DEGLI STUDI DI MILANO BICOCCA

Outline

- Who are the patients
- Main pre-operative and post-operative complications
- What to do
- Conclusions

UNIVERSITÀ DEGLI STUDI DI MILANO BICOCCA

Outline

- Who are the patients
- Main pre-operative and post-operative complications
- What to do
- Conclusions

UNIVERSITÀ DEGLI STUDI DI MILANO BICOCCA

Clinical characteristics of hip fracture patients

	Pioli et al 2012* (n=806)	Bellelli-Annoni (n=326)**
Age (mean±SD)	85.8±5.6	84.1±6.3
Sex (male %)	23.7	19.9
Living in nursing home (%)	9.4	5.5
Intracapsular hip fracture (%)	46.9	48.5
Trochanteric hip fracture (%)	46.0	45.7
Subtrochanteric hip fracture (%)	7.1	5.8
Charlson Index (mean score±SD)	2.4±2.0	2.8±2.2
Malnourished (MNA-SF < 8) (%)	--	28.2
APS (mean score±SD)	2.9±2.6	--
SOFA score (mean score±SD)	--	0.8±1.1
Cognitive impairment (%)	62.2	--
MMSE (mean score±SD) (0-30)	--	19.4±8.4#
ADL (mean score±SD)	3.5±1.7	4.0±1.9
Independent walk (%)	69.2	
New Mobility Score (mean score±SD) (0-9)	--	4.6±2.7

** modified, Pioli et al, Arch Gerontol Ger 2012; ** unpublished; # 291 patients*

Comorbidities in 78.5%

Cardiac (CAD, HF)	22.5%
Peripheral vascular disease	15.3%
CVD	20.9%
Dementia	37.7%
COPD	16.3%
Hepatic disease	4.6%
Connective tissue disease	4.0%
Diabetes	16.6%
Neoplasm	13.5%
Stroke	10%
Neurological disorders	9%
Psychiatric disorders	8%
Renal failure	4%

Polypharmacy is common (mean drugs = 3.6±2.0),
41.1% with benzodiazepines, antidepressants or neuroleptics

Bellelli-Annoni 2013, unpublished

Outline

- Who are the patients
- Main pre-operative and post-operative complications
- What to do
- Conclusions

UNIVERSITÀ DEGLI STUDI DI MILANO BICOCCA

High incidence of complications - 51%

Respiratory Infections	15.5%
Urinary Tract Infections	15.1%
Acute cardiac episodes	7.8%
Other complications	6.3%
Pre-surgical delirium	21.1%
Post-surgical delirium	33.9%

Bellelli-Annoni 2013,unpublished

Effect of comorbidities and postoperative complications on mortality after hip fracture in elderly people: prospective observational cohort study

J J W Roche, R T Wenn, O Sahota, C G Moran

Table 4 Multivariate Cox regression analysis of all variables for 30 day and one year mortality. Figures are hazard ratios (95% confidence intervals)

	30 day mortality	1 year mortality
Male sex	1.5 (1.1 to 2.0)*	1.8 (1.5 to 2.1)**
Age (years)†:		
60-69		
70-79	1.1 (0.5 to 2.1)	1.3 (0.9 to 2.0)
80-89	1.3 (0.7 to 2.6)	2.0 (1.4 to 2.8)
≥90	1.5 (0.8 to 3.0)	2.8 (1.9 to 4.1)
Comorbidities		
Cardiovascular disease	0.7 (0.5 to 0.9)	1.0 (0.8 to 1.2)
Respiratory disease	1.6 (1.1 to 2.2)*	1.4 (1.1 to 1.7)*
Stroke	0.97 (0.7 to 1.4)	0.9 (0.8 to 1.2)
Renal disease	1.8 (1.01 to 3.2)*	1.6 (1.1 to 2.3)*
Diabetes	0.97 (0.6 to 1.5)	1.3 (1.0 to 1.6)*
Parkinson's disease	1.1 (0.6 to 2.0)	1.1 (0.8 to 1.6)
Rheumatoid disease	0.97 (0.5 to 2.0)	0.9 (0.6 to 1.4)
Paget's disease	0.9 (0.1 to 6.4)	1.9 (0.9 to 4.1)*
Enteral steroids	1.5 (0.7 to 3.0)	1.7 (1.1 to 2.6)*
Malignancy	1.6 (1.1 to 2.5)*	1.6 (1.2 to 2.0)**
Current smokers	0.3 (0.2 to 0.6)*	0.8 (0.6 to 1.1)
Postoperative complications		
Chest infection	3.0 (2.1 to 4.2)**	2.4 (1.9 to 3.0)**
Cardiac failure	8.0 (5.5 to 11.6)**	5.0 (3.9 to 6.5)**
Urinary tract infection	0.6 (0.3 to 1.4)	0.9 (0.6 to 1.3)
DVT/PE	4.5 (2.7 to 7.6)**	2.1 (1.4 to 3.1)*
Gastrointestinal bleed	3.3 (1.4 to 7.7)*	2.5 (1.4 to 4.5)*
Myocardial infarction	3.2 (1.6 to 6.5)*	2.4 (1.4 to 4.0)*
Stroke	1.6 (0.8 to 3.3)**	2.4 (1.6 to 3.7)**
Deep wound infection	0 (0 to ∞)	1.1 (0.7 to 1.9)

Prospective observational cohort study
2448 consecutive patients with acute hip fracture over a four year period

BMJ 2005; 331:1374-doi 10.1136/bmj.38643.663843.55

Myocardial Infarction After Hip Fracture Repair: A Population-Based Study

Jeanne M. Huddleston, MD,[*†] *Rachel E. Gullerud, BA,*[‡] *Fantley Smither, BS,*[§] *Paul M. Huddleston, MD,*[‖] *Dirk R. Larson, MS,*[‡] *Michael P. Phy, DO,*[#] *L. Joseph Melton, III, MD,*[‖**] *and Veronique L. Roger, MD*[**††]

1009 pts Rochester E
From 1988 to 2002

116 (10.5%) clinicall
41 (3.07) syubclinica

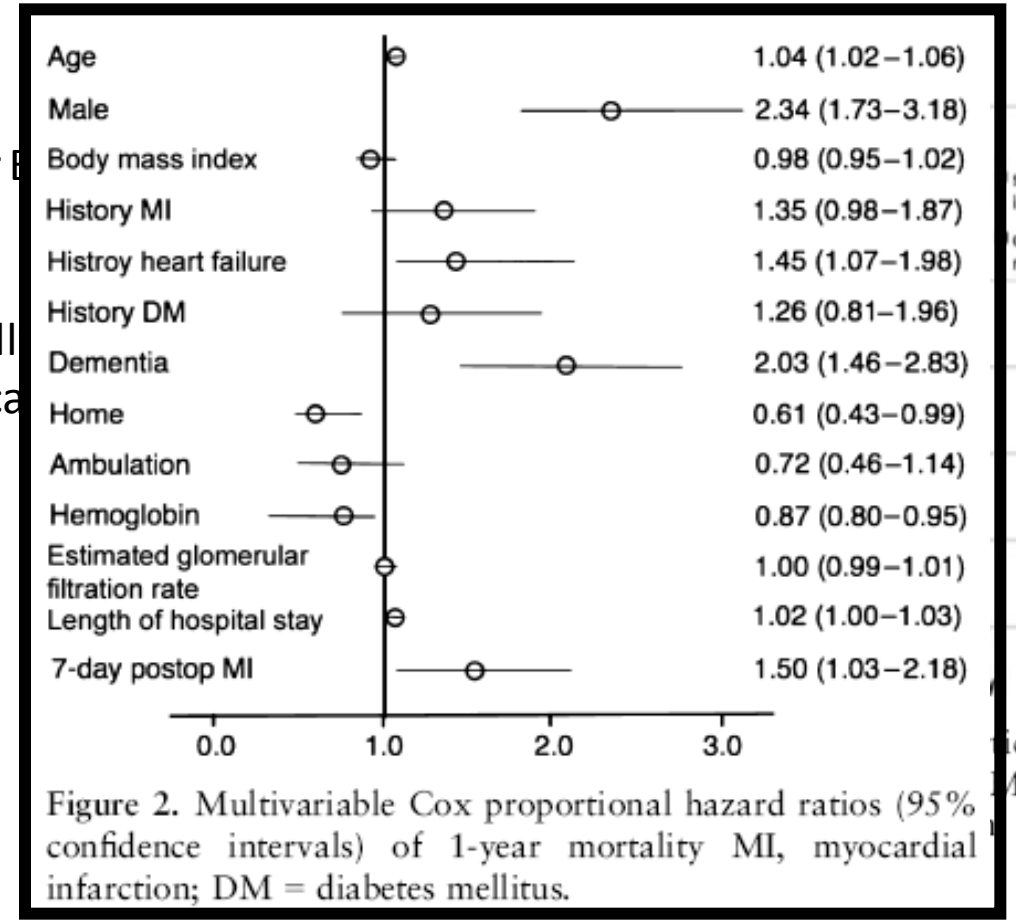
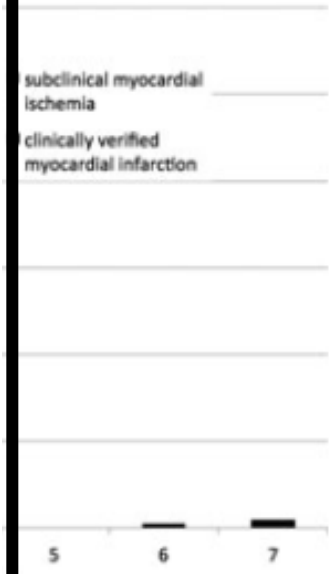


Figure 2. Multivariable Cox proportional hazard ratios (95% confidence intervals) of 1-year mortality MI, myocardial infarction; DM = diabetes mellitus.



icipants with clinically ver-
MI) and enzymatic leaks

J Am Geriatr Soc 2012; 60: 2020-2026

Incidence of delirium is maximal in hip fracture patients

Population	Incidence	Author
Hip fracture	44%	Berggren et al.
	19%	Edlund et al.
	16%	Morrison et al.
	20%	Schuurman et al.
Elective orthopedic	18%	Fisher et al.
	28%	Rogers et al.
Elective Liver resection	17%	Yoshimura et al.
Major elective surgery	9% (46% aortic surgery)	Marcantonio et al.
Elective vascular	36% (52% aortic)	Schneider et a.

Dasgupta M et al, JAGS 2006;54:1578-1589

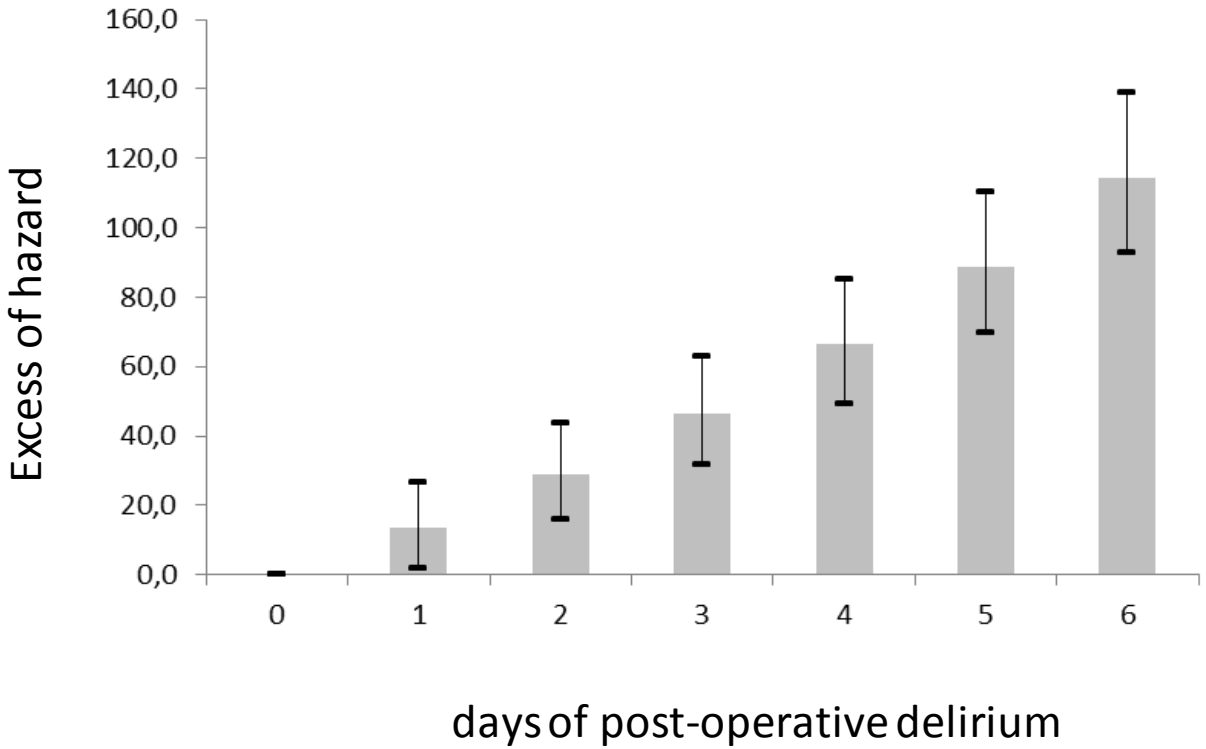
Il delirium è un predittore indipendente di mortalità nei pazienti dopo 1 anno dalla frattura di femore

Variable	HR	95% CI	*P*
Age, years	1.04	1.01–1.08	.0155
Male/female	1.93	1.23–3.03	.0044
Charlson Comorbidity Index	1.16	1.05–1.28	.0024
Drugs	0.97	0.89–1.05	.3955
Delirium (present/absent)	1.59	1.03–2.46	.0385
ASA	1.06	0.69–1.62	.7994
Dementia (present/absent)	0.61	0.36–1.02	.0615
Delay-no ADL impairment	1.74	0.59–5.20	.3169
No delay-ADL impairment	3.98	1.41–11.27	.0092
Delay-ADL impairment	5.80	2.11–15.92	.0007

ADL, Activities of Daily Living; ASA, American Society of Anesthetists.

Bellelli G et al, JAMDA 2012; 13: 664.e9e664.e14

Duration of delirium is associated with an increased risk of 6-month death

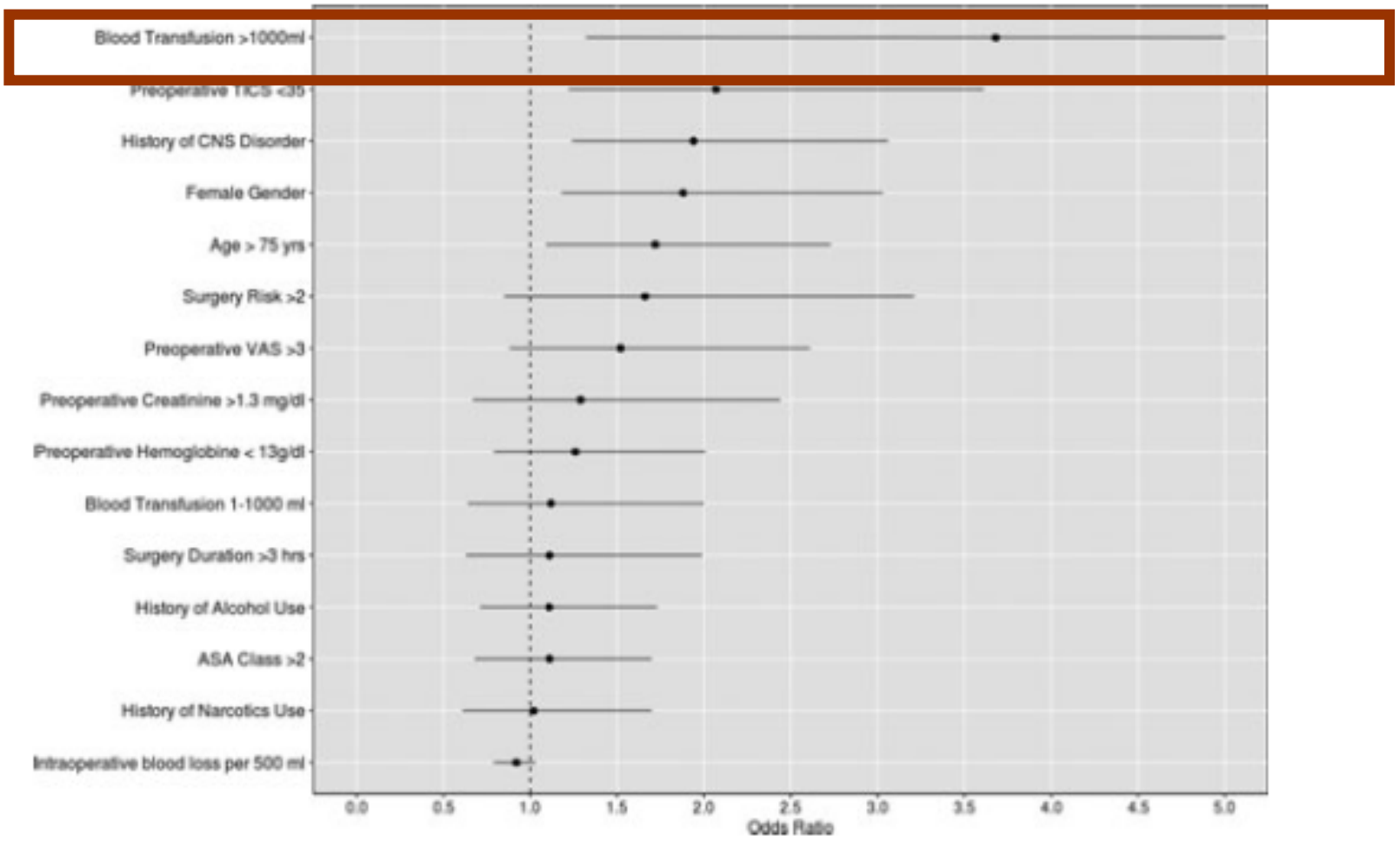


Excess of mortality risk at 6 months for cumulative days of delirium in OGU and corresponding 95% CI

Bellelli -Annoni, et al, unpublished data

Association Between Intraoperative Blood Transfusions and Early Postoperative Delirium in Older Adults

Matthias Behrends, MD, Glen DePalma, MS,† Laura Sands, PhD,‡ and Jacqueline Leung, MD, MPH**



J Am Geriatr Soc 2013; 61: 365-370

Outline

- Who are the patients
- Main pre-operative and post-operative complications
- What to do
- Conclusions

UNIVERSITÀ DEGLI STUDI DI MILANO BICOCCA

Geriatric Fracture Center reduces complications

Table 4. Effect of Multidisciplinary Treatment of Hip Fracture Patients Aged ≥65 Years (2009-2010 Group) Compared With Usual Treatment (2007-2008 Group)

Complications during hospitalization			
Year, n	2007-2008 (n = 90)	2009-2010 (n = 140)	*P* value
Complications, n (%)[a]			
Delirium[b]	30 (33%)	54 (39%)	.421
Mild			
Urinary tract infection[c]	14 (16%)	9 (6%)	.024
Urinary retention[d]	9 (10%)	4 (3%)	.022
Superficial wound infection[e]	12 (13%)	14 (10%)	.436
Serious			
Pneumonia[f]	11 (12%)	13 (9%)	.477
Heart failure[g]	15 (17%)	16 (11%)	.256
Myocardial infarction[h]	2 (2%)	2 (1%)	.653
Osteosynthesis failure[i]	4 (4%)	3 (2%)	.437
Deep wound infection[j]	3 (3%)	0	.059
Death[k]	8 (9%)	7 (5%)	.244
Other[l]	31 (34%)	33 (24%)	.073
Total number of complications per patient excluding delirium, median (IQR)	1 (0-2)	0 (0-1)	.017

2007-2009 Usual Treatment
2009-2010 Multidisciplinary Treatment

Folbert E, et al. Ger Orthop Surg 2012; 3:59-67

Orthogeriatric care reduces delirium

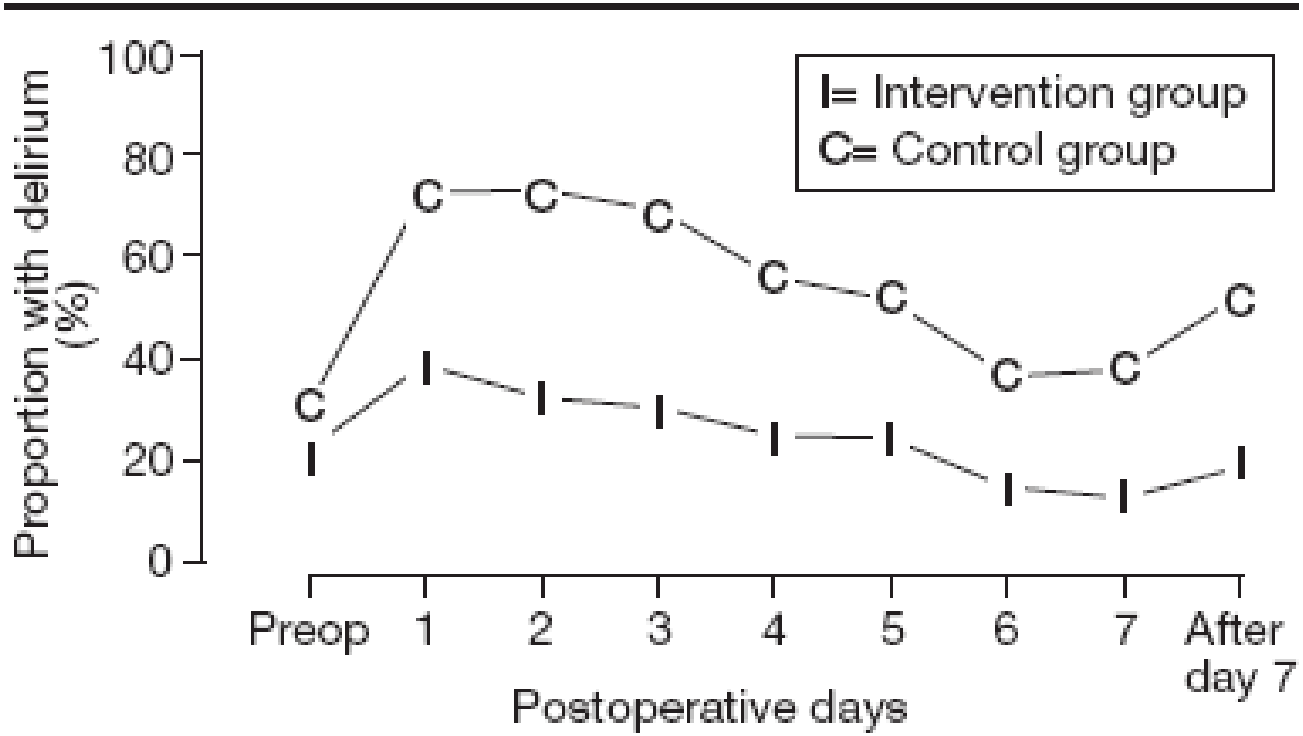


Fig. 2 - *Line plot showing proportion of patients with delirium each day during hospitalization in intervention (I) vs control groups (C).*

Lundström M et al, Aging Clin Exp Res 2007; 19:178-186

Geriatric co-managed care reduces mortality in hip fracture patients

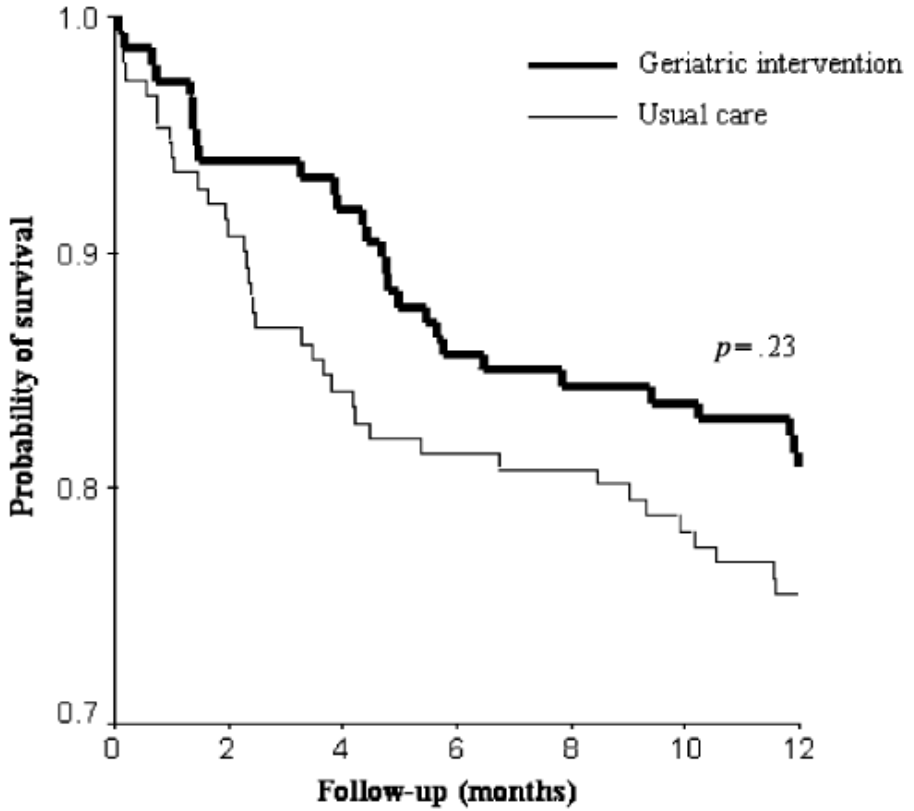
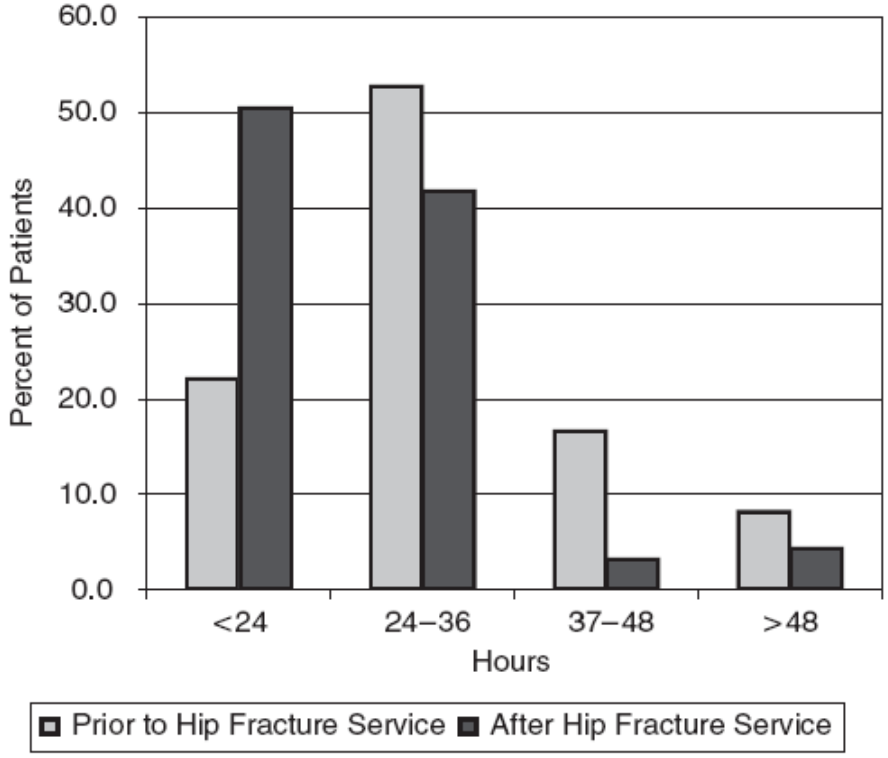


Figure 2. Survival curves of patients assigned to the geriatric intervention group and the control group.

Vidan et al J Am Ger Soc 2005; 53: 1476-1482

Geriatrician-Led Hip Fracture Program reduces time to surgery and costs



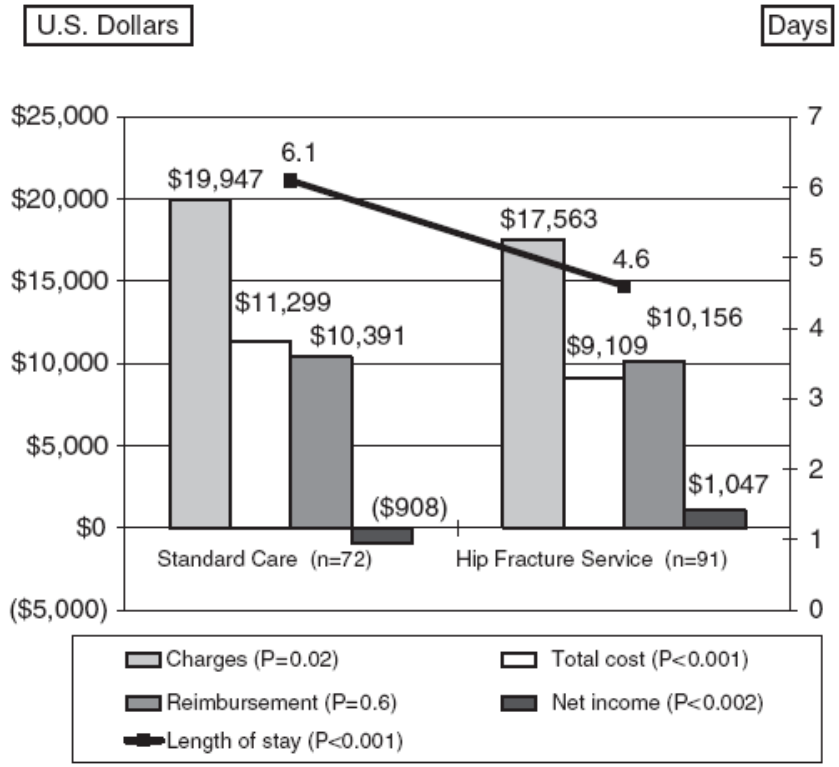


Figure 3. Time to surgery.

Miura L, et al, J Am Geriatr Soc, 2009;57:159-167

What's the secret of the success?

Anaesthesia
Journal of the Association of Anaesthetists of Great Britain and Ireland

Table 2. Reasons for delaying surgery for hip fracture that the Working Party considers acceptable and unacceptable.

Acceptable	Unacceptable
• Uncontrolled or acute onset left ventricular failure. • Correctable cardiac arrhythmia with a ventricular rate > 120 .min^{-1}. • Chest infection with sepsis. • Reversible coagulopathy.	expertise. • Minor electrolyte abnormalities.

Adopt protocols

Review

The Orthogeriatrics Model of Care: Systematic Review of Predictors of Institutionalization and Mortality in Post-Hip Fracture Patients and Evidence for Interventions

Marta Martinez-Reig MD [a,b,c], Laura Ahmad MD, PhD, FRACP [d], Gustavo Duque MD, PhD, FRACP [a,b,*]

Summary of the Evidence on the Major Components of Orthogeriatrics Care and NH

Predictors of NHA after Hip Fracture
- Cognitive impairment [a]
- Comorbidity
- [illegible]

Interv
- [illegible]

Interv
Hip
- [illegible] artery disease, pre-surgery anemia, IDC at time of NHA, pressure ulcers, pneumonia.
- Predictors of subsequent fracture: higher function level, previous fracture, previous falls.
- Interventions to decrease mortality: treatment with zoledronic acid.
- Interventions to prevent subsequent fracture: Vitamin D with/without calcium supplementation, hip protectors.
- Interventions to reduce number of falls: multifactorial fall prevention programs, high doses of vitamin D supplementation.

ADL, activities of daily living; IDC, indwelling urinary catheters; NHA, nursing home admission.

[a]Also during the follow-up.

Use multidimensional assessment

J Am Med Dir Assoc. 2012 Nov;13(9):770-7.

Effect of an Inpatient Geriatric Consultation Team on Functional Outcome, Mortality, Institutionalization, and Readmission Rate in Older Adults with Hip Fracture: A Controlled Trial

Mieke Deschodt, RN, MSN,[*†] *Tom Braes, RN, MSN,*[*†] *Paul Broos, MD, PhD,*[‡] *An Sermon, MD,*[‡] *Steven Boonen, MD, PhD,*[§,‡] *Johan Flamaing, MD, PhD,*[†] *and Koen Milisen, RN, PhD*[*†]

No consultations, but interdisciplinary team

Table 4. Univaria

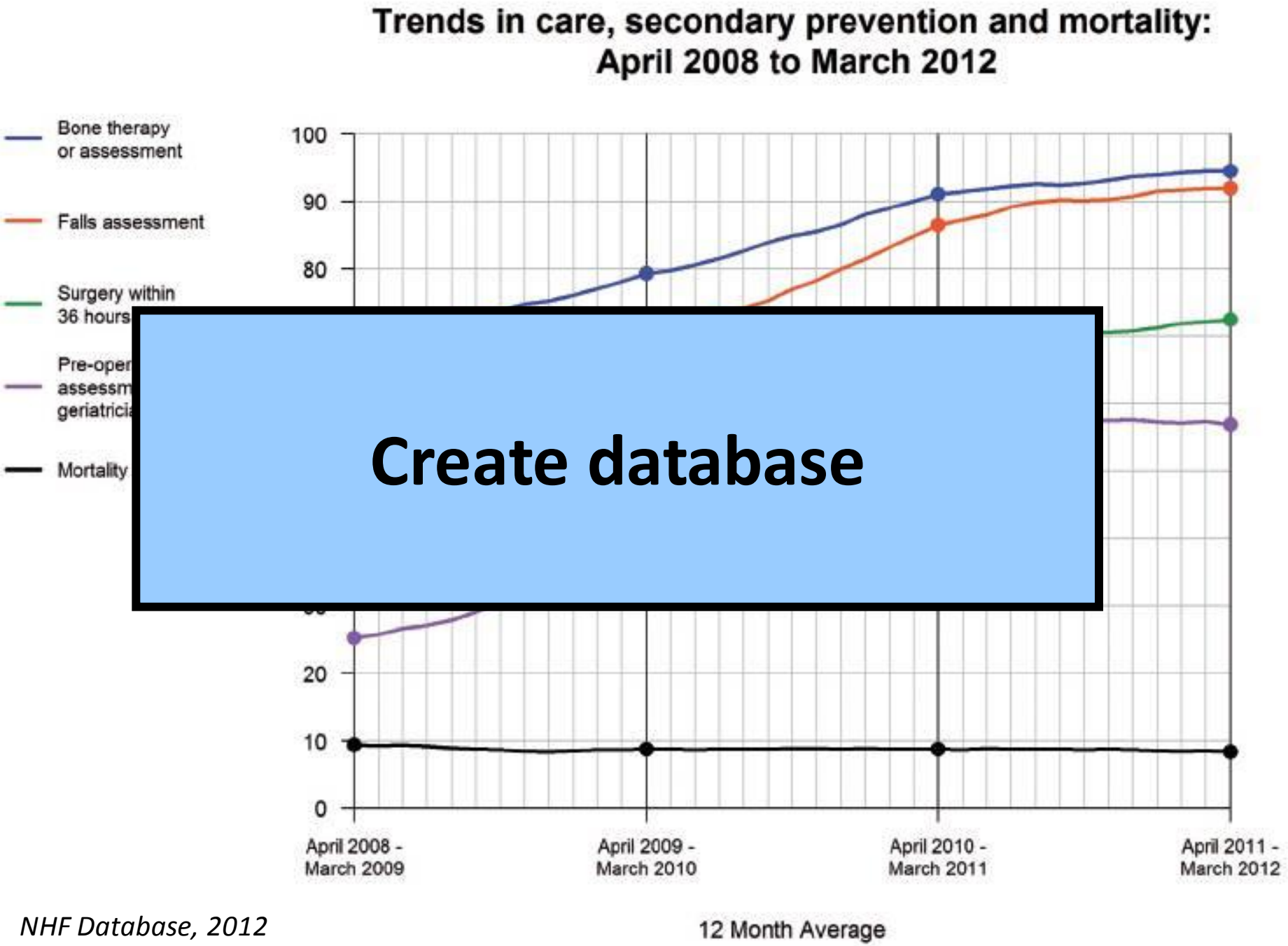
Time Between Hip Fr… Replacement an… Assessment												
Day 1												
Discharged												
Day 3												
Discharged												
Day 5	12.8 ± 2.9	13.4 ± 2.8	.16*									
Discharged	3	5										
Day 8	12.0 ± 2.7	12.9 ± 2.5	.02*									
Discharged	24	14										
6 weeks	11.2 ± 3.4	11.9 ± 3.1	.13*	4 (4.3)	3 (3.9)	>.99†	3 (3.2)	5 (6.5)	.47†	4 (5.9)	3 (5.2)	>.99†
4 months	10.0 ± 3.8	10.8 ± 3.9	.19*	15 (16.0)	9 (11.7)	.42‡	10 (10.6)	11(14.3)	.47‡	8 (11.8)	7 (12.1)	.96‡
1 year	9.8 ± 3.8	10.0 ± 3.4	.34*	20 (21.3)	17 (22.1)	.90‡	25 (26.6)	22 (28.6)	.77‡	9 (13.2)	7 (12.1)	.85‡

…rsing Home Admission

…tion …8) | Control (n = 58)

n (%) | P-Value

J Am Geriatr Soc 2011; 59:1299-1308



Create database

NHF Database, 2012

Take home messages

- Comorbidity is common in hip fracture patients
- Clinical problems (especially cardiovascular, respiratory and delirium) are frequent and require specific approaches
- Orthogeriatric interdisciplinary care can reduce the burden of complications
- Database and retrospective evaluation of clinical outcomes as a method to improve care