



Peri-operative Management of Hip fracture: An Ortho-geriatric Co-management

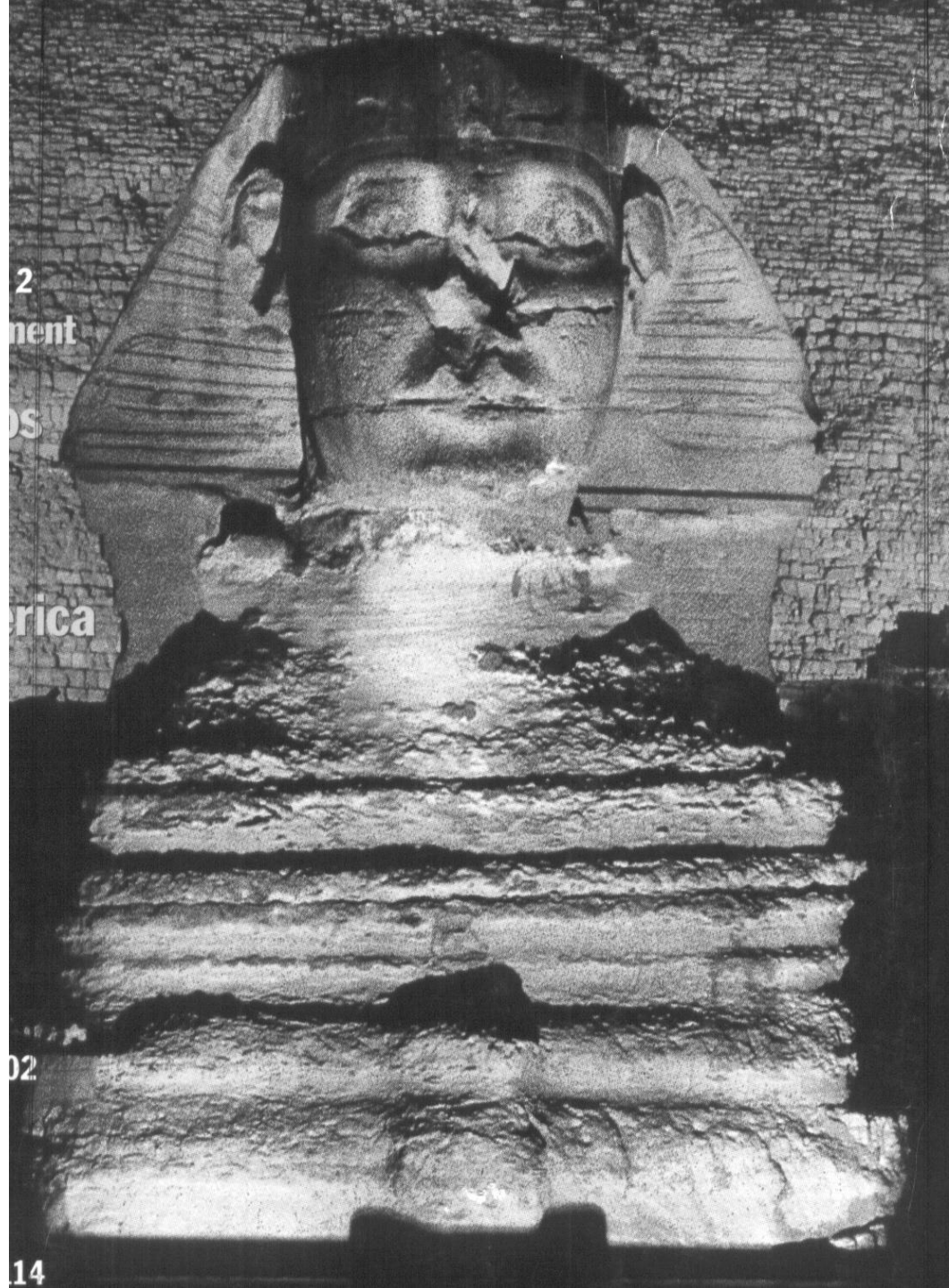
Dr David Dai

Prince of Wales Hospital

16th January, 2010

The Riddle of the Sphinx

*“What is it that
has one voice
and yet
becomes four-
footed and three-
footed?”*



A framed illustration showing an elderly woman in a dark dress and headscarf carrying a large woven basket on her back. She is walking through a doorway. To her left, a man in a green coat and hat stands in the doorway, looking towards her. A small basket sits on the floor in the foreground. The scene is set in a simple, possibly outdoor or semi-outdoor, environment.

**Hip Fracture
is a
Geriatric Syndrome**

Old Age

Frailty (Reserve) and Vulnerability

Osteopenia

Sarcopenia

Falls

Pre-morbid multiple co-morbidities

Pre-operative medical instability (metabolic, CVS,
respiratory)

Hospitalization syndrome (Delirium, infection,
polypharmacy)

Post-operative instability (CVS, neurological, metabolic,
respiratory, fever)

Functional decline

Psychosocial issues

Post-discharge support

Frailty
Fracture
Syndrome

Post discharge period
"1 year"

An aerial photograph of a tropical island. The island is covered in dense green vegetation and has a small white sandy beach with several palm trees. The surrounding water is clear and blue, showing a coral reef with various shades of cyan and blue. The text is overlaid on the center of the image.

A Geriatric Syndrome

**NOT managed by the
geriatrician or orthopedic
surgeon alone**

The Modern Hip Fracture Programme

(Curr Anaes & Crit Care 2005(16): 2-10)

British Geriatric Society's Framework Document on Orthogeriatric Service(2004):

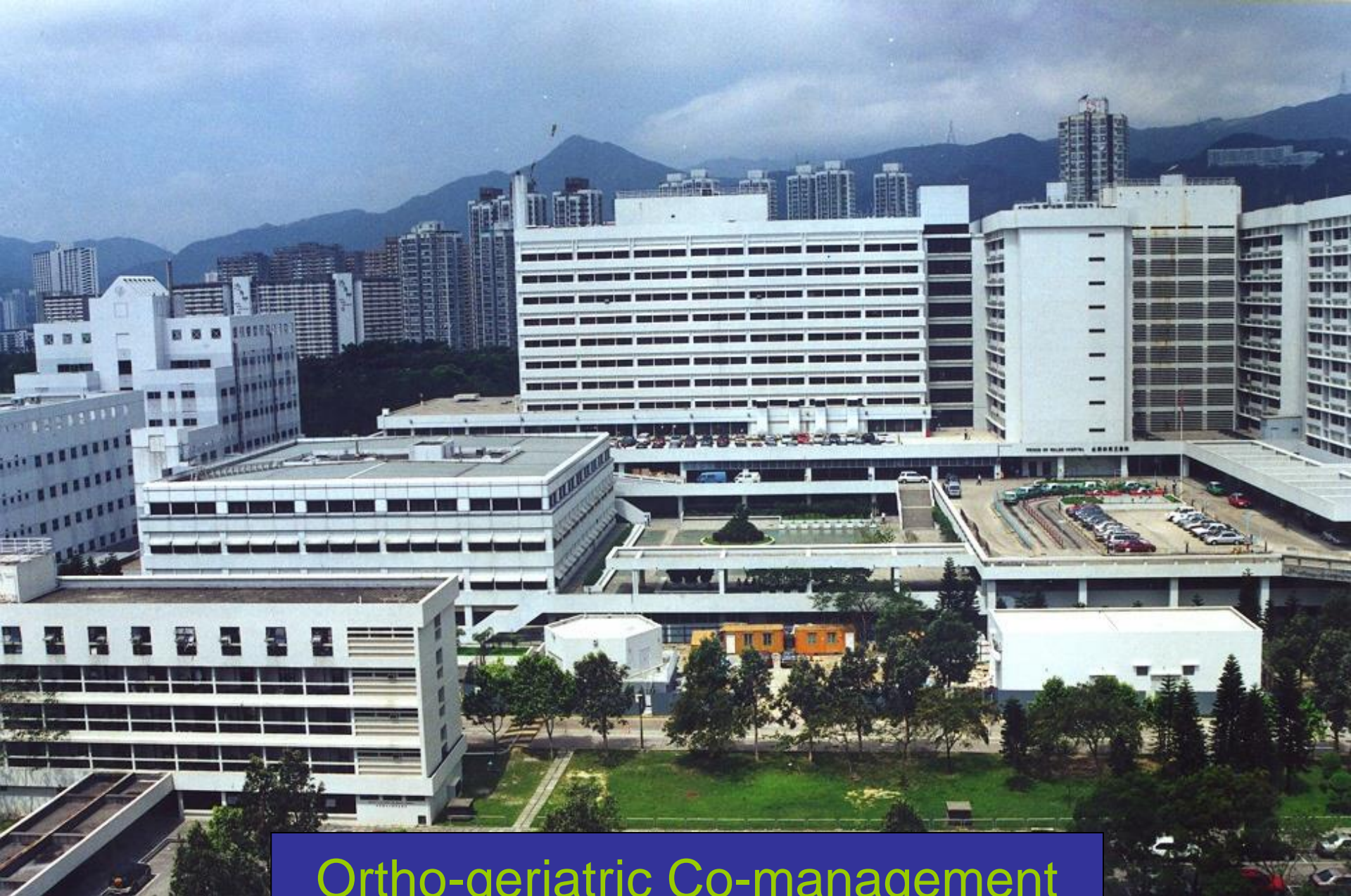
“ Presence of specialized medical staff in the acute orthopedic ward is of great benefit”

British Orthopedic Association(2004):

“Immediate involvement of orthogeriatricians from admission to discharge is to be advocated as the way forward”

Conjoint Orthogeriatric Programmes

- 1) Qual Saf Health care 2006; 15: 375-379
- 2) **Evidence-based clinical pathway**
www.qshc.com/supplemental
- 3) **Comprehensive geriatric intervention**
 - a) M. Vidan et al, JAGS 2005; 53: 1476-1482
RCT n=155/164
 - b) Yea-Ing Lotus Shyu et al, JAGS 2005; 53: 811-818
RCT n= 68/69
- 4) **Hospitalist model**
P Michael et al
retrospective case control n= 230/236
- 5) **Co-management**
J Huddleston et al Ann Intern Med 2004; 141: 28-38
RCT n= 251/254



Ortho-geriatric Co-management at PWH

The Effect and Cost-effectiveness of Orthogeriatric intervention

(JAGS 2009; 57: 11- 12)

Wency Ho et al

Division of Geriatrics, Department of Medicine and
Therapeutics

Orthopedic and Traumatology Department

Prince of Wales Hospital

OUR TEAM

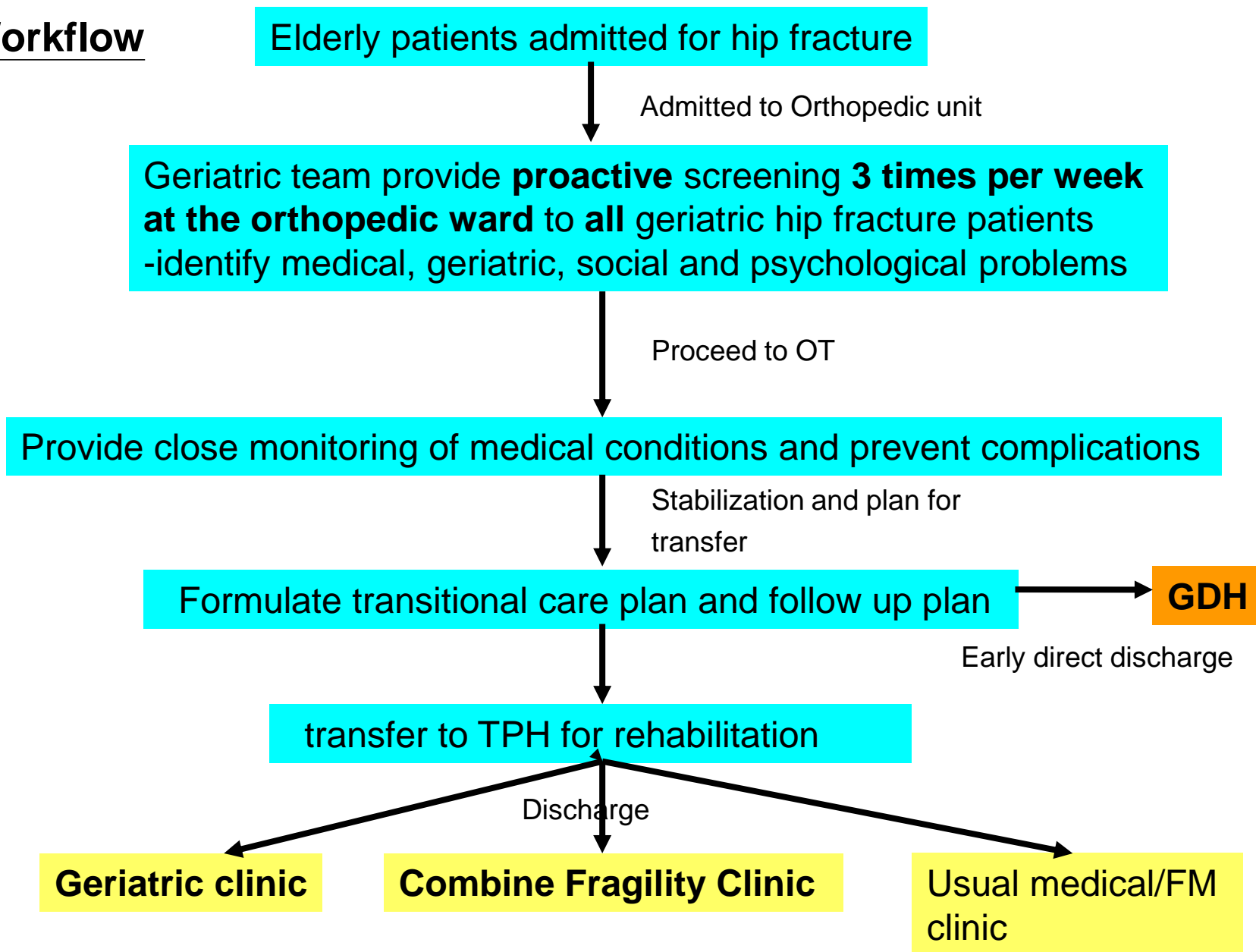


- Dr David Dai
 - consultant geriatrician
- Dr Wency Ho
 - assoc consultant
- Dr Liu Kin Wah
 - geriatric specialist
- Ms Eliza Lau
 - geriatric nurse specialist

Objectives

- To evaluate the effectiveness of a comprehensive geriatric intervention in elderly patients with acute hip fractures
- Started since 2004
- Aims to
 - Reduce mortality
 - Reduce length of hospitalization
 - Reduce waiting time from admission to operation
 - Reduce hospital cost

Workflow







Independent Nurse Assessment

PWH Randomized Interventional Trial of Geriatric- Orthopedic Liaison on Acute Hip Fracture Elderly Data Entry Sheet 2007

Gum label (with address/ telephone no.)

1. Name 2. HK ID No. 3. Sex 4. Age

Ward _____ Bed no. _____

Date of assessment _____

5. 1. **Interventional arm** 2. **Conventional arm**

6. Orthopedic Diagnosis 1. NOF (R)/(L)
2. Trochanteric (R)/(L)
3. Others (R)/(L)

8. History of Hip fracture 1. Yes 2. No

7. Type of operation 1. DHS
2. Intra-medullary nail (Gamma)
3. AO screw
4. Hip screw
5. Hemiarthroplasty (AMA)
6. Open reduction of fracture
7. Girdlestone operation
8. Conservative

9. Date of operation _____
10. Date of transfer/ discharge _____
11. Days from admission to day of operation _____
12. Days from operation to transfer/ discharge _____
13. Type of anaesthesia 1. GA 2. SA

14. Past Medical History

1. ACS/ MI
2. CHF
3. HT
4. PVD
5. DM
6. DM with complication
7. Respiratory disease
8. Liver disease
9. Peptic ulcer

10. Renal disease
11. Stroke
12. Dementia
13. Parkinson's disease
14. Connective tissue disease
16. Joint problem of LLs
17. Carcinoma site _____
18. Others _____

Premorbid Social and Functional Status

15. Marital status 1. Married 2. Widowed 3. Single

21. Drug History (before admission)

16. Residential status 1. Lives alone
2. Lives with spouse/ caregiver
3. Residential care

1. Total no of regular medications _____
2. No of CVS medications _____
3. No of analgesics _____
4. No of anti-psychotic medications _____
5. No of sedating medications _____
6. Anti-platelet agent _____

17. MFAC _____
18. Use of aids 1. Frame/ Rolater 2. Quadripod 3. Stick 4. none

19. Modified Barthel index _____/20
20. Norton Score _____/20

Cognitive status on admission

22. MMSE _____/30
23. MDAS _____/30
24. CAM 1. Yes 2. No

25. Pre op-medical intervention

1. CVS 1. BP control 2. CCF 3. Arrhythmia 4. ACS 5. Heart murmurs
2. Respiratory 1. Chest infection 2. COAD
3. Neurological 1. Ischemic stroke 2. Intra-cranial hemorrhage
4. Endocrine 1. DM control 2. Thyroid
5. Cognition 1. Delirium
6. Electrolytes 1. Na 2. K 3. Ca 4. Dehydration
7. Renal 1. UTI 2. Retention of urine 3. Renal failure
7. GI 1. GIB
8. Hematological 1. DVT 2. PE
9. Drug adjustment
10. Sepsis _____
11. Others _____

26. Risk Factors Identification

1. Gait, postural and neurological problems
2. Musculoskeletal problems
3. Medical condition
4. Neuropsychiatric condition
5. Impaired senses
6. Medications
7. Improper walking device
8. Environmental hazards
9. Trip
10. Others



Post-operative

27. Significant Medical Complication

1. Delirium 6. MI
2. Retention of urine 7. Arrhythmias
3. Fluid overload/ CHF 8. DVT/ PE
4. Pneumonia. 9. Pressure ulcer
6. Stroke 10. Renal failure
5. Sepsis 11. Others _____

Delirium screening (post op day 1)

28. "Did you undergo surgery?" 1. Correct 2. Incorrect
29. "When?" 1. Correct 2. Incorrect
30. MDAS _____/30
31. CAM 1. Yes 2. No

Upon discharge from PWH

32. Total length of stay at PWH _____

33. Total no of non-geriatric medical consultations (routine+ urgent) _____
34. Deceased 1. Yes 2. No

35. Functional status upon discharge

1. MFAC _____
2. Use of aids 1. Frame/ Rolater 2. Quadripod 3. Stick 4. none
3. Modified Barthel index _____/20

36. Next care setting 1. TPH 37. Geriatric ambulatory support 1. CNS
2. Home/ usual living place (upon direct discharge) 2. CGAT
3. Medical unit (take over) 3. GDH
4. Arrange medical /geriatric clinic follow up

Close attention to the Post-operative period with regard to the Pre-morbid medical status

Results

Table 1. Baseline characteristics of the study cohort.

	Conventional care group (n = 274)	Geriatric intervention group (n = 283)	P value
Age (year)	82.4 ± 7.8 (range 65 – 105)	82.5 ± 7.8 (range 66 – 101)	0.51
Gender (female/male)	202 / 72	217 / 66	0.43
Living at home before admission, %	76.6	73.1	0.38
Diabetes mellitus, %	23.4	21.6	0.61
Hypertension, %	55.8	55.8	1.00
Admission during weekends, %	25.1	30.0	0.34
Type of fracture			
Neck of femur	152	140	0.38
Trochanter	106	120	
Others	16	21	
Conservative management, %	6.2	8.8	0.26
Delay in surgery (waiting for > 48 hrs), %	33.9	30.0	0.24

Values are mean ± SD (range) unless otherwise stated.

All cause mortality during hospitalization and after 1 year

	Conventional care group (n = 274)	Geriatric intervention group (n = 283)	<i>P</i> value
In-hospital	4.0% (11)	1.1% (3)	0.03
1 year	19.3% (53)	10.6% (30)	0.004

- Absolute reduction in in-hospital mortality = **72.5%**
- Absolute reduction in 1 year mortality = **45.1%**

Probability of patient survival after hip fracture according to geriatric intervention

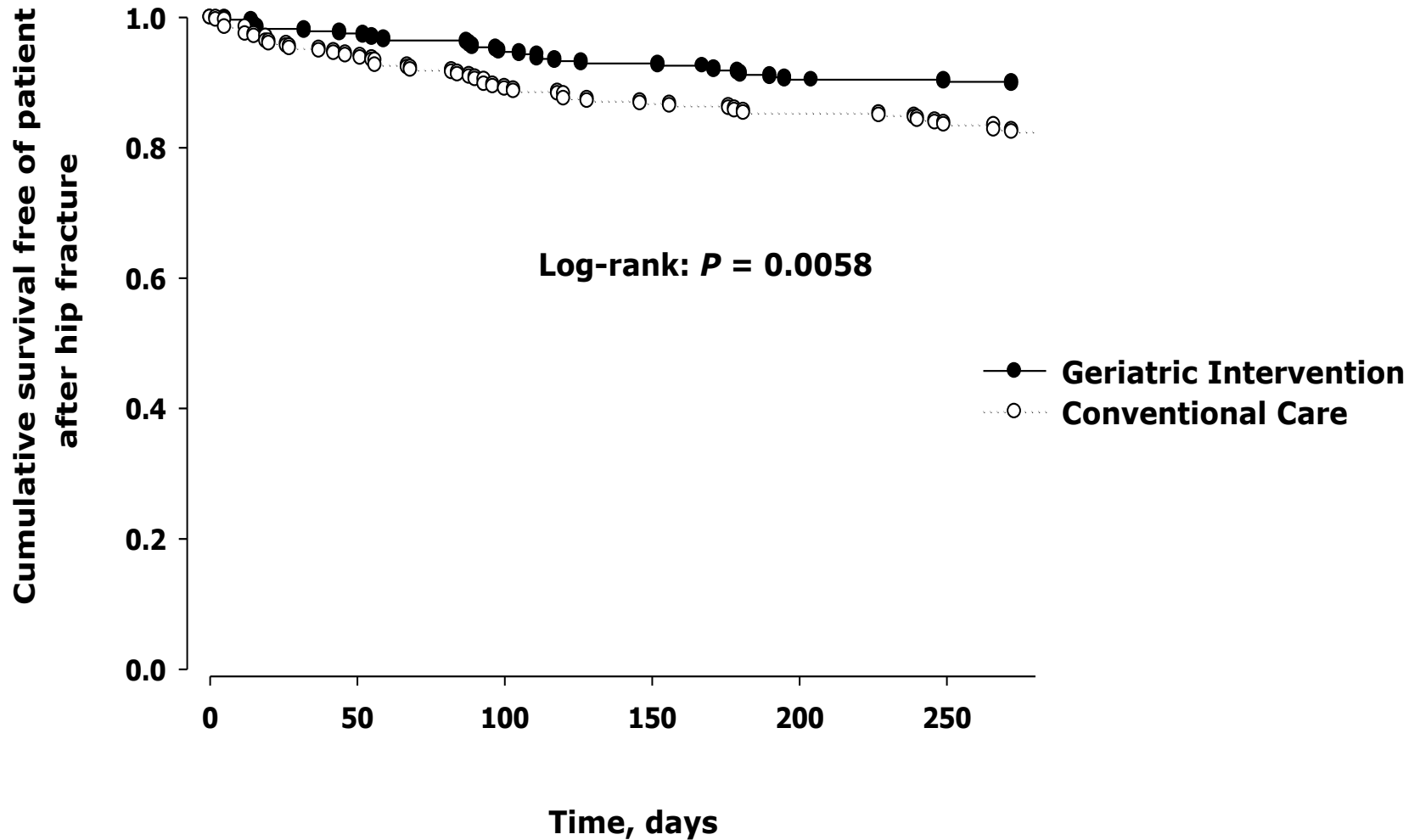


Table 2. Treatment outcomes in terms of reduction of length of stay and time to surgery of the study cohort.

	Conventional care group (n = 274)	Geriatric intervention group (n = 283)	<i>P</i> value
Length of stay, days	9.7 ± 5.7 (range 1 – 38)	8.3 ± 4.4 (range 2 – 29)	0.001
Median time from admission to surgery, days	2.0 (IQR 1.0 – 3.0)	1.0 (IQR 1.0 – 2.0)	0.001

Values are mean ± SD (range) unless otherwise stated.
IQR denotes interquartile range.

Number of hospital to hospital transfer event before and after implementation of intervention

	Total number of hospital transfer to medical units (PWH/AHNNH)	Total number of hospital transfer to all units
Control arm 2004-05 N=274	28	74
Geri intervention arm 2005-06 N=283	7	25
% of hospital transfer reduced	75%	66.2%

Hospital to hospital transfer due to change in clinical condition was significantly reduced after the intervention

Cost-effective analysis (2004-2006)

Manpower cost

- Crude manpower cost estimation per year
 - 1 consultant or 1 specialist + 1 geriatric specialist nurse
 - ~1 hour/ session
 - 3 sessions/ week x52

Cost analysis

- Total \$ saved: \$913,130 - \$171,893+
\$ 468,198+\$146,608 - \$28,140
= **\$1,327,902** after the implementation of
comprehensive ortho-geriatric intervention
in one year

Discussion

- Geriatric Intervention significantly reduce in-hospital, 90-day mortality in acute hip fracture elderly
- Effective to reduce length of hospital stay (↓waiting time to operation)
 - **Early detection** of high risk patients with medical and geriatric problems
 - Provides a standardized with close monitoring of peri-operative care by the **same team**
 - Provides **continuity** of geriatric care upon discharge to rehabilitation hospital or community

Expected benefits of acute orthogeriatric care
(Curr Anaes & Critical Care 2005, 16:2-10)

Superior medical care

Optimal scheduling of fracture surgery

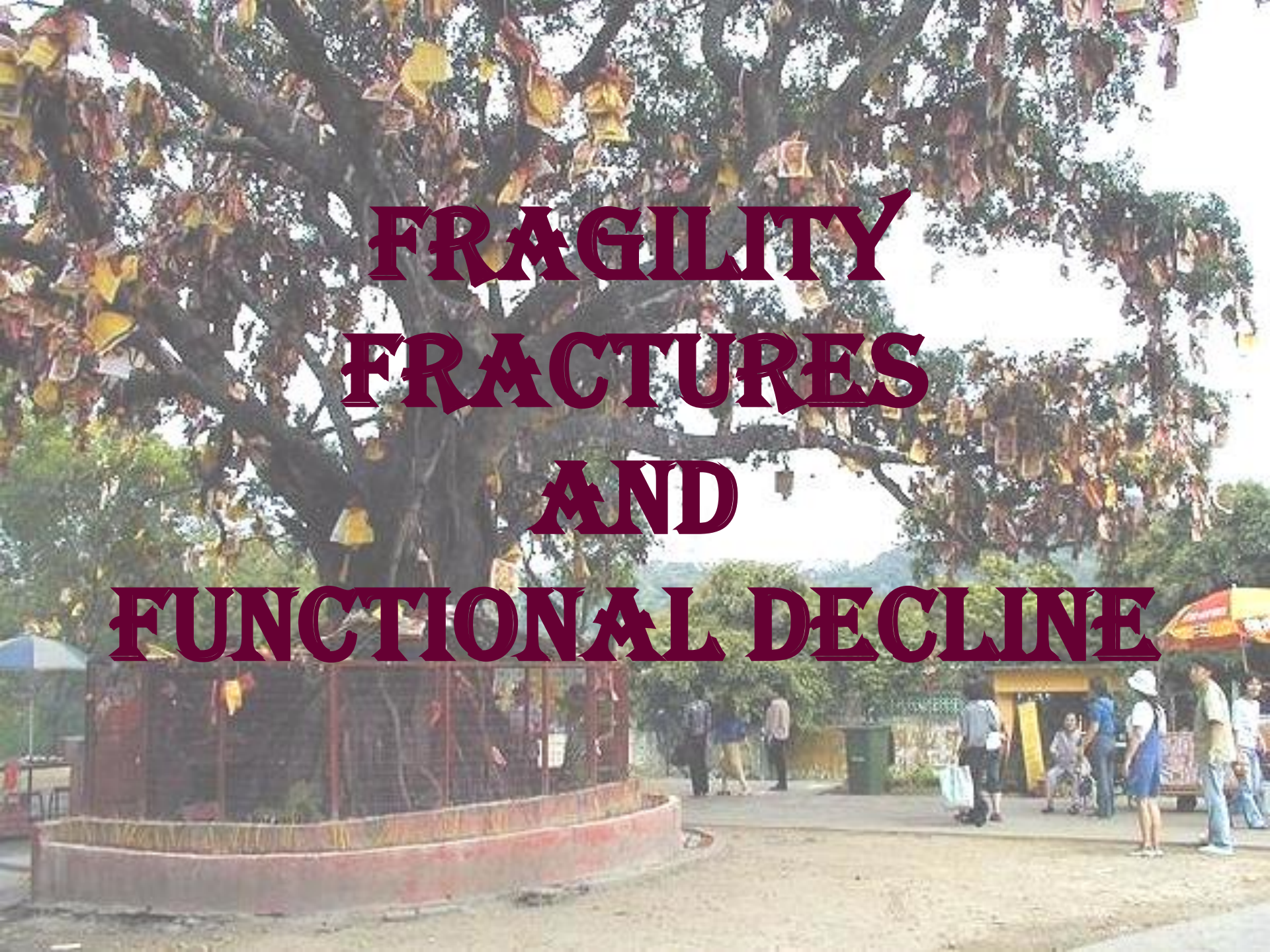
Better communication with patients and
their relatives

Better communication within the
multidisciplinary team

Initiation of research, education and audit

Reduction in adverse events

Earlier initiation of rehabilitation and more
effective use of discharge resources

A large, ancient tree with thick, gnarled branches dominates the scene. The tree is heavily laden with numerous colorful prayer flags in shades of yellow, orange, red, and purple, which are hanging from the branches and swaying in the breeze. The background shows a paved area where several people are walking or standing. Some are carrying bags, and one person is using a wheelchair. There are some structures and a trash bin visible in the distance. The overall atmosphere is one of a public gathering or a place of cultural significance.

**FRAGILITY
FRACTURES
AND
FUNCTIONAL DECLINE**

Declining Physiological Reserves

(Crit Care Med 2004; 32(suppl): S92-S101)

- Cardiac
- Respiratory
- Renal
- GI
- Hepatobiliary
- Body composition and energy use
- **CNS**
- Pain
- Immune function
- Haemopoietic

A painting of a man with a distorted, elongated face, wearing a blue patterned shirt and a red tie, set against a red background. The man's face is stretched vertically, and his eyes are closed or heavily shadowed. The overall style is expressive and somewhat abstract.

*Delirium
on Dementia*

Delirium associated with orthopedic surgery: Meta-analysis

Studies	Prevalence of preoperative delirium	Proportion of delirium cases with preoperative onset	Proportion persisting postoperatively
Brauer et al, 2000	4.4%	46% (25/54)	Not stated
Kaganksy et al, 2004	5.9%	50% (6/12)	83% (5/6)
Morrison et al, 2003	8.1%	39% (46/117)	Not stated
Formiga et al, 2003	12.7%	34% (13/38)	Not stated
Edlund et al, 1999	19%	68% (10/15)	100% (10/10)
Edlund et al, 2001	29.7%	61% (30/49)	97% (29/30)
Gustafson et al, 1988	33%	54% (37/68)	100% (37/37)
Johansson et al, 2002	35.6%	92% (26/28)	46% (12/26)

Incidence of Delirium: 35% (*Bitsch 2004*)



SSM 3117
**Delirium in acute hospital:
Hip Fracture Patients**

Katherine Cheng

Kelly Fung

Sunny Choi

Sylvia Chow

Polly Tse

26th May, 2008

Chinese University of Hong Kong

Characteristics	No delirium	Delirium	
		With dementia	Without dementia
Number of patients	20(60.6%)	7 (21.2%)	6 (18.2%)
Mean age (years)	82.60	86.29	82.50
Gender			
Male	5 (15.15%)	1 (3.03%)	0
Female	15 (45.45%)	6 (18.18%)	6 (18.18%)
Type of hip fracture			
Femoral	12 (36.36%)	3 (9.09%)	4 (12.12%)
Inter-trochanteric	6 (18.18%)	3 (9.09%)	2 (6.06%)
Others	2 (6.06%)	1 (3.03%)	0
Type of operation			
Surgery	12 (36.36%)	4 (12.12%)	4 (12.12%)
Conservative	3 (9.09%)	2 (6.06%)	1 (3.03%)
Vitamin B12 level <200pmol/L	6(18.18%)	2 (6.06%)	1 (3.03%)

Delirium : 39.39%

Delirium (DEL) and longer term effects in hip fracture

- Peri-operative DEL is associated with medical co-morbidity: 28-41% (incidence)
- Pre-operative DEL is associated with poorer functioning in physical, cognitive and affective domains and mortality
- Persistent post-operative DEL is associated with poor functional recovery
- Brief post-op DEL (<6 wks) is associated with more in-hospital medical complications, longer DOS and poorer function at 3 months (Anesth Analg 2004; 98: 1798-1802)

Post-op DEL is associated with poor cognitive outcome and dementia

(Dement Geriatr Cogn Disord 2006; 21: 221-227)

- Incidence of dementia 18.1% /yr (vs 5.6% without DEL) (Rockwood 1999)
- 55% in 30 months (Rahkonen 2000)
- 69% in 5 yrs; 100% for pre-op DEL; strongest association in oldest elder (Lundstrom 2001)

電腦掃描室
CT Scanning Room



RADIATION 輻射

CONTROLLED AREA 管制區

NO
UNAUTHORISED ENTRY 非請勿進

DO NOT ENTER
WHEN RED LIGHT
IS ON 紅燈亮時
切勿內進

CUBE
Scan

Model: 101-68817 ASE-APP
Lot: 1000-1000-1000-1000-1000-1000
Part: BLANKER ULTRASONIC BLASTER
Brand: 1000-1000-1000-1000-1000-1000
Model: 1000-1000-1000-1000-1000-1000
Ser#: 1000-1000-1000-1000-1000-1000

MeCube Main Machine & Machine
MeCube Technology

PWR 

Print 
Scan 



Interventions to reduce Delirium

Nurse led interdisciplinary programme

(JAGS 2001; 49: 523-532)

- Education of nursing staff
- Systematic cognitive screening
- Geriatric liaison
- Scheduled pain protocol
- Reduced duration and severity of delirium

Proactive geriatric consultation

(JAGS 2001; 49:516-522)

- O2
- Fluids
- Pain
- ↓medications
- Bladder/bowel
- Nutrition intake

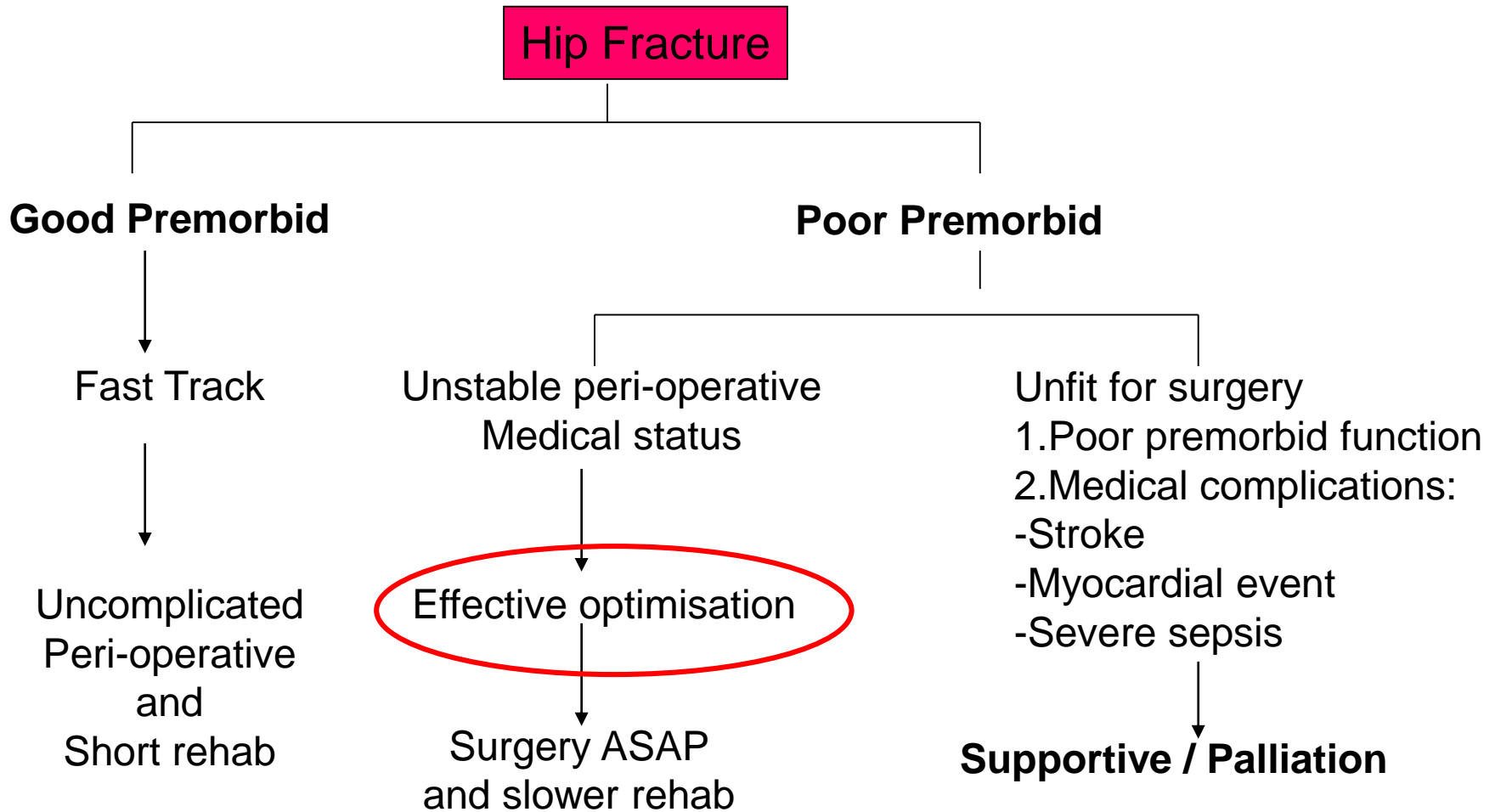
- Early mobilization and rehabilitation
- Prevent, early detection and treatment of major post-op complications(myocardial, respiratory, pulmonary emboli, UTI)
- Environmental stimuli

Guidelines

Royal College of Physicians SIGN

- Surgery **within 24 hours** if medical condition permits
- Delayed surgery increases mortality and morbidity and adverse effect on rehabilitation
- Medically unfit patients should not be rushed to theatre before **medical optimization**

3 Categories of Patients



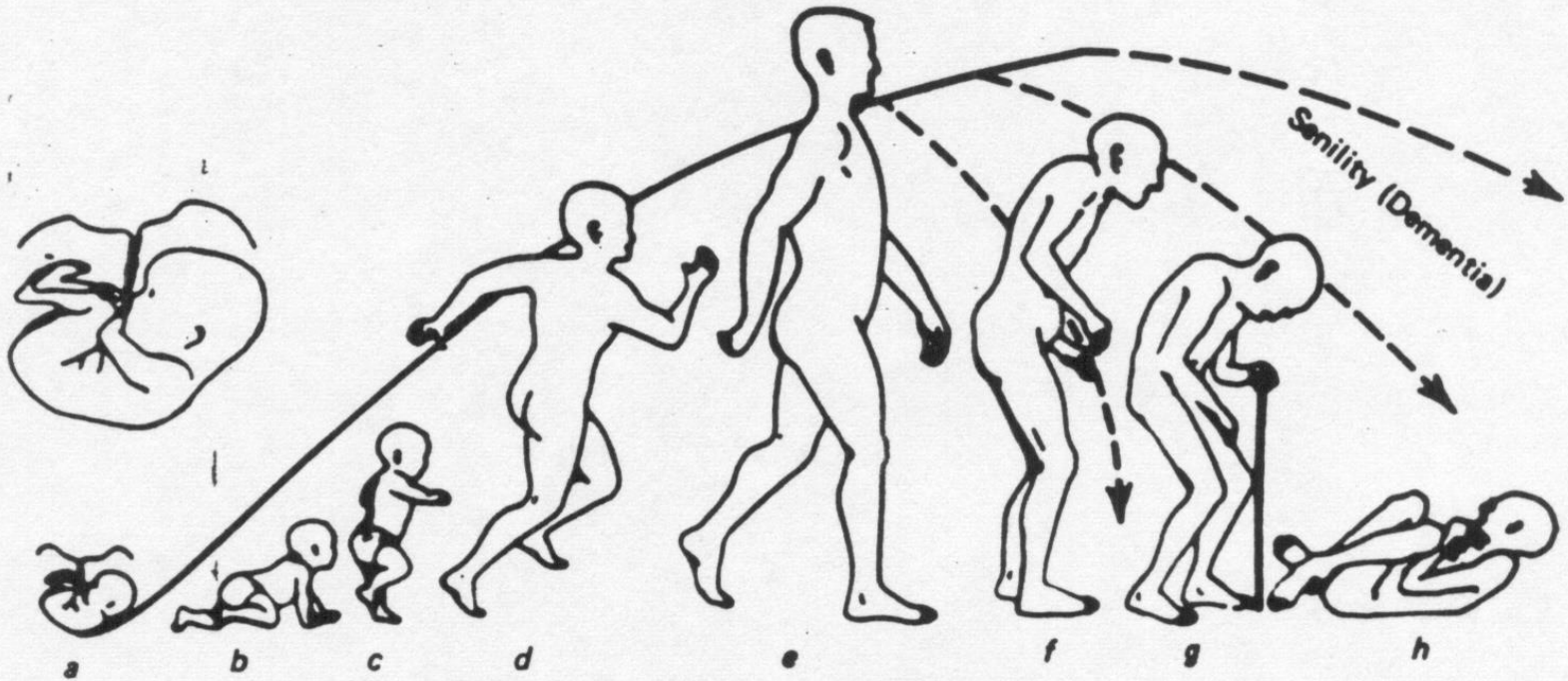


FIG. 1

The evolution and dissolution of erect stance and gait. (Reproduced by permission of Churchill Livingstone) From Obeso, J., Traub, M. and Marsden, C. (1983) In *Hearing and Balance in the Elderly* (Hinchcliffe, R. ed.).

The Humanity Riddle



**HAPPY NEW YEAR
2010**