

효과적인 노인기능 평가

전혜진

분당차병원 가정의학교실

연수강좌

Characteristics of geriatric diseases

- 1) Atypical presentation
- 2) Multiple pathology
- 3) Chronic degenerative disease
- 4) Combine with functional decline
- 5) Related to socio-environmental factors
- 6) High prevalence of iatrogenesis



✓ Geriatric conditions such as functional impairment and dementia are common and frequently unrecognized or inadequately addressed in elderly.
 ∴ Early identification by performing screening can help clinicians manage these conditions and prevent or delay their complications.

Atypical presentation of geriatric diseases

| Disorder | Typical presentation | Atypical presentation |
|--------------------|---|--|
| Pneumonia | Cough, SOB, Sputum | Absence of typical symptoms, Malaise, Anorexia, Confusion |
| MI | Severe, Substernal chest pain, SOB, Nausea | Mild or no chest pain, Confusion, Weakness, Dizziness |
| UTI | Dysuria, Frequency, Hematuria | Absence of dysuria, Confusion, Incontinence, Anorexia |
| Thyrotoxicosis | Rapid heart rate, Restlessness, Agitation and Tremor | Lethargy, Cardiac arrhythmias, Fatigue, Weight loss |
| Acute appendicitis | RUQ abdominal pain, Fever, Tachycardia | Diffuse abdominal pain, Confusion, Urgency, Absence of fever/tachycardia |
| Infection | Fever, Tachycardia, Elevated WBC | Temperature normal or low, Absence of tachycardia, Normal WBC |
| Depression | Low mood, Increased sleep time, Fluctuation in weight | Confusion, Apathy, Absence of subjective feeling of depression |

- Frail elderly are more likely to present atypically than well elderly.
- Delirium (61%) is the most atypical presentation.

노인 입원환자의 주증상과 최종 진단 (n=69)

| Chief complaints | Final main diagnosis | No (%) |
|---|---------------------------------|----------|
| General weakness (34pt, 49.3%) | Depression | 8 (11.6) |
| | Acute cystitis | 6 (8.7) |
| | Pneumonia | 6 (8.7) |
| | Tuberculosis | 4 (5.8) |
| | Anxiety disorder | 3 (4.3) |
| | Gastric ulcer | 3 (4.3) |
| | Hyponatremia | 2 (2.9) |
| | Acute nasopharyngitis | 1 (1.5) |
| | Dementia | 1 (1.5) |
| | | 1 (1.5) |
| Poor oral intake (16pt, 23.2%) | Gastritis, gastric ulcer | 8 (11.6) |
| | Tuberculosis | 2 (2.9) |
| | Pneumonia | 2 (2.9) |
| | Hyponatremia | 2 (2.9) |
| | Acute bronchitis | 1 (1.5) |
| | Acute cystitis | 1 (1.5) |
| Myalgia with febrile sense (10pt, 14.5%) | Acute pyelonephritis | 4 (5.8) |
| | Depression, Somatoform disorder | 3 (4.3) |
| | Pneumonia | 2 (2.9) |
| | Viral illness | 1 (1.5) |
| | | 1 (1.5) |
| Dizziness (9pt, 13.0%) | Iron deficiency anemia | 4 (5.8) |
| | Depression | 2 (2.9) |
| | Tension type headache | 2 (2.9) |
| | Alzheimer disease | 1 (1.5) |

Jl. Yoon, JS Park, MY Kim, JAGG world congress, 2013

Risk factors of Fall → Comprehensive evaluation

신체적 요인

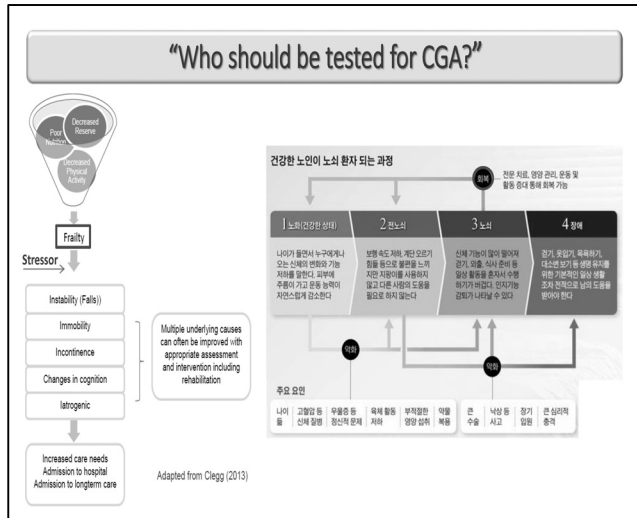
- 낙상의 과거력
- 보행 장애
- 균형감각 저하
- 낙상에 대한 두려움
- 근력 저하
- 보조기구 사용
- 우울, 인지기능 저하
- 저혈당
- 시력저하
- 80세 이상의 고정
- 관절염
- 일상 생활 능력 저하
- 2군데 이상의 통증
- 높은 통증 강도

환경적 요인

- 어두운 불빛
- 필요한 물타리가 없을 때
- 면저저 있는 깔개
- 보행에 방해되는 전기 코드
- 욕실 손잡이의 부재
- 미끄러운 바닥
- 편광하지 않은 길
- 젖은 길
- 어두운 불빛
- 예상치 못한 높이 차이

약물적 요인

- 항정신병제
- 항불안제
- 항경련제
- 진정제, 수면제
- 근육이완제
- 항고혈압제
- 이뇨제
- 항부정맥제



"Who should be tested for CGA?"

Prefrail Frail

노쇠 의심 증상 체크리스트

- 10개 계단을 올라가는 것이 어렵다
- 400m 운동장 한 바퀴를 혼자 걷는 게 어렵다
- 의자에서 5회 연속해서 일어나다 앉았다 하는 것이 불가능하다
- 건거나 바깥 출입하는 경우가 1주에 1회 이하이다
- 종아리 둘레가 32cm 이하이다
- 손아귀 힘(악력)이 현저하게 약해졌다

Timed Up and Go (TUG)

의자에서 일어나 3m 지점을 돌아서 의자에 다시 앉는 시점까지의 소요시간을 측정
해석: 수행에 소요된 시간이 10초가 넘는 경우 신체기능 저하 혹은 노쇠를 의심

Walking speed > 5 secs to walk 4m

- 시작지점에 두 발로 서있다가 출발하고 종로지점을 멈추지 않고 지나갈 때, 측정자가 종로지점을 지나갈 때 시간 측정
- 1.0 m/s 미만의 보행속도가 사망 위험 증가와 관련 있음
 $\leq 1.0 \text{ m/s}$ 일 때, $4\text{m gait speed} = 0.01 + (2.5 \text{ m gait speed})(1.052)$
 $> 1.0 \text{ m/s}$ 일 때, $4\text{m gait speed} = 0.481 + (2.5 \text{ m gait speed})(0.581)$

"Who should be tested for CGA?"

Prefrail Frail

<DEEP IN>
 D- Dementia, Depression, Drugs, Delirium
 E- Eyes
 E- Ears
 P- Physical Performance, Phalls(falls), Psychosocial, Ph(f)unction, Pain
 I- Incontinence
 N- Nutrition

<5 I's>
 Iatrogenesis
 Mental Incompetence
 Incontinence
 Immobility
 Impaired homeostasis

'기능' 중심으로 분류!

<3M>
 Mobility
 Mentation
 Micturition

* Timed up and go test > 10 secs
 * Walking speed > 5 secs to walk 4m

Characteristics of geriatric diseases

- Atypical presentation
- Multiple pathology
- Chronic degenerative disease
- Combine with functional decline
- Related to socio-environmental factors
- High prevalence of **iatrogenesis**

For the collateral effects of the last drug I gave you, take this other one, and then if there are any side effects I will prescribe you a third to help with them.

Can't I just have my old illness back?

*** Risk Factors**

- Normal age-related changes
- High prevalence of comorbidity
- Provider attitudes/preference
- Inadequate geriatric training

*** Adverse drug reactions**

- Delirium
- Falls and Injuries
- Incontinence
- Immobility

"The Prescribing Cascade"

| Initial treatment | Adverse effect | Subsequent treatment | Subsequent adverse effect |
|--------------------|------------------------|----------------------------|---|
| NSAIDs | Rise in blood pressure | Antihypertensive treatment | Orthostatic hypotension |
| Thiazide Diuretics | Hyperuricemia | Allopurinol | Hypersensitivity reaction (Skin rashes) |
| | Gout | NSAIDs | Rise in blood pressure |
| NSAIDs | Edema | Thiazide diuretics | Hyperuricemia Gout |

Source: Adapted from Rochon and Gurwitz, 1997

"The Prescribing Cascade"

| Medication | New symptoms | New medication |
|---------------------|----------------------|---|
| Ibuprofen | BP ↑ | Antihypertensive |
| Enalapril, Ramipril | Cough | Dextromethorphan |
| Metoclopramide | Parkinsonism | Levodopa/carbidopa |
| Amlodipine | Edema | Furosemide |
| Gabapentin | Edema | Furosemide |
| Ciprofloxacin | Delirium | Risperidone |
| Lithium | Tremor | Propranolol |
| Bupropion | Insomnia | Mirtazapine |
| Doxepin | Urinary incontinence | Oxybutynin |
| Amiodarone | Tremor | Lithium |
| Verapamil | Tremor | Diazepam |
| Meperidine | Delirium | Risperidone |
| β-blocker | Depression | Antidepressant |
| Amitriptyline | Decreased cognition | Doxepin |
| Narcotics | Constipation | Sennosides |
| Sennosides | Diarrhea | Loperamide |
| Lorazepam | Morning drowsiness | Caffeine |
| Furosemide | Hypokalemia | Potassium supplement |
| NSAIDs | Heartburn | H ₂ -antagonist or proton pump inhibitor |
| Omeprazole | Low B ₁₂ | B ₁₂ supplement |

*** 무엇을 줄까? → * 무엇을 뺄까?**

| Signs or Symptoms | Common Drug-Related Causes |
|---------------------------|--|
| Falls | Sedatives, hypnotics, anticholinergics, antihypertensives, antidepressants, antidiabetics |
| Cognitive impairment | Anticholinergics, benzodiazepines, antihistamines, tricyclic antidepressants |
| Incontinence | Alpha-blockers, antidepressants, sedatives, diuretics |
| Constipation | Anticholinergics, opioids, tricyclic antidepressants, calcium channel blockers, calcium supplements |
| Delirium | Antidepressants, antipsychotics, antiepileptics |
| Diarhea | Antibiotics, proton pump inhibitors, allopurinol, selective serotonin reuptake inhibitors, angiotensin II receptor blockers, psycholeptics (anxiolytics, antipsychotics) |
| Gastrointestinal bleeding | Nonsteroidal anti-inflammatory drugs, oral anticoagulants |

*Geriatric Syndromes

In general, consider a drug as the cause when elderly patients present with a new symptom.

Aging Successfully, Spring 2011;21:21-22

International Journal of Environmental Research and Public Health
Article
Social Frailty Leads to the Development of Physical Frailty among Physically Non-Frail Adults: A Four-Year Follow-Up Longitudinal Cohort Study
Huma Makizako ^{1,2,*}, Hiroyuki Shimada ², Takehiko Doi ², Kota Tsutsumimoto ², Ryo Hotta ², Shu Nakakubo ², Keitaro Makino ² and Sangyoon Lee ²

| Variable | Social Non-Frailty (n = 932) | Social Pre-Frailty (n = 250) | Social Frailty (n = 40) | p * |
|-------------------------------------|------------------------------|------------------------------|-------------------------|-------|
| BMI, mean ± SD (kg/m ²) | 23.3 ± 3.0 | 23.3 ± 3.1 | 23.3 ± 3.0 | 0.959 |
| Physical performance | | | | |
| Grip strength, mean ± SD (kg) | 29.0 ± 7.4 | 28.5 ± 7.5 | 28.1 ± 7.4 | 0.567 |
| Walking speed, mean ± SD (m/s) | 1.32 ± 0.17 | 1.30 ± 0.17 | 1.25 ± 0.16 | 0.009 |

* Odds ratios for the development of physical frailty after four years

| Baseline Status of Social Frailty | Dependent Variable: Incidence of Physical Frailty | | | | | |
|-----------------------------------|---|-------------|---------|-------------|---------|-------------|
| | Crude | | Model 1 | | Model 2 | |
| | OR | 95% CI | OR | 95% CI | OR | 95% CI |
| Not socially frail | 1 | [Reference] | 1 | [Reference] | 1 | [Reference] |
| Socially pre-frail | 1.50 | 0.58-3.92 | 1.49 | 0.57-3.90 | 1.22 | 0.45-3.25 |
| Socially frail | 4.47 * | 1.25-16.06 | 3.98 * | 1.09-14.59 | 3.93 * | 1.02-15.15 |

Note: OR, odds ratio; CI, confidence interval; the bold typeface indicates statistical significance; * p < 0.05; Model 1: adjusted for age and gender; Model 2: adjusted for age, gender, BMI, number of prescribed medications, hypertension, heart disease, diabetes mellitus, osteoporosis, grip strength (baseline) and walking speed (baseline).

- ✓ Among independent community-dwelling older adults who are not physically frail, those who are socially frail may be at greater risk of developing physical frailty in the near future.
- ✓ Social frailty may precede (and lead to the development of) physical frailty.

Int. J. Environ. Res. Public Health 2018, 15, 490

Preventing Falls in Community-Dwelling Frail Older People Using a Home Intervention Team (HIT): Results From the Randomized Falls-HIT Trial

Thorsten Nikolaus, MD,* and Matthias Bach, MD†

Subgroup Analysis of Fall Rates and Proportion of Frequent Falls According to Prior Falls

| Falls | Intervention Group | Control Group |
|---|--------------------|---------------|
| Subjects with no or one fall in past year, n (n = 252) | 128 | 124 |
| Falls, n | 100 | 115* |
| Fallers with ≥2 falls in follow-up period, n (%) | 30 (23.4) | 25 (20.2) |
| Subjects with two or more falls in past year, n (n = 108) | 53 | 55 |
| Falls, n | 63 | 89† |
| Fallers with ≥2 falls in follow-up period, n (%) | 21 (39.6) | 36 (65.5) |

*Incidence rate ratio = 0.91, 95% confidence interval = 0.72-1.22.

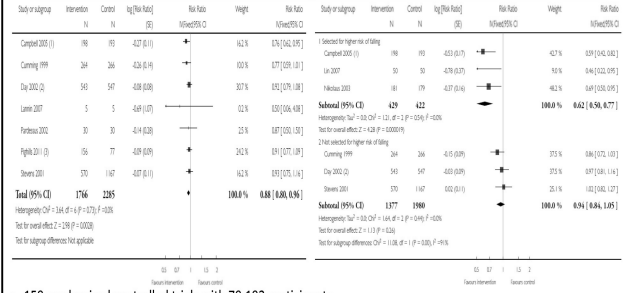
†Incidence rate ratio = 0.63, 95% confidence interval = 0.43-0.94, P = .028.

- ✓ The intervention group had 31% fewer falls than the control group (incidence rate ratio (IRR) 0.69, 95% CI 0.51-0.97).

JAGS 51:300-305, 2003

Interventions for preventing falls in older people living in the community (Review)

Gilliespie LD, Robertson MC, Gillespie WJ, Sherrington C, Gates S, Clemson LM, Lamb SE



- 159 randomized controlled trials with 79,193 participants

- Interventions to improve home safety appear to be effective, especially in people at higher risk of falling and when carried out by occupational therapists.

The Cochrane Collaboration, 2015

Hendry et al. BMC Geriatrics (2015) 15:17
DOI 10.1186/s12877-015-0016-1

"단일 선별질문만으로 충분인가.."

A try is better than a blank..

RESEARCH ARTICLE

Open Access

Informant single screening questions for delirium and dementia in acute care – a cross-sectional test accuracy pilot study

단일 선별질문



(보호자용)

"당신의 가족/친구의 인지기능이 지난 5년간 일상생활에 문제가 될 정도로 떨어졌습니까?"

(환자용)

"일상생활에 문제가 될 정도로 기억력이 떨어졌습니까?"

(민감도 83.3%, 특이도 93.1%)



r/o Dementia

Mini-Cog

MMSE

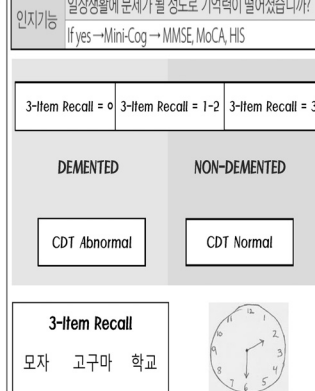
MoCA

HIS



CAM

GDS

CDR



2019년 대한임상건강증진학회 추계학술대회

| MMSE-K | | | MoCA | | | | | |
|-----------|-----|---|-------------|--|---------------|-----|-----|-----|
| 대분류 | 세분류 | 소분류 | 문항 | | 점수 | | | |
| 지남력 | 1 | 오늘은 몇 년입니까? | 시공간(배경력) |  | 시계 (시계) (10분) | | | |
| | 1 | 몇 월? | | [] | | | | |
| | 1 | 몇 일? | | | | | | |
| | 1 | 무슨 요일? | | | | | | |
| | 1 | 요즈음은 어떤 계절입니까? | | | [] | [] | [] | [] |
| 기억력 | 1 | 당신은 무슨 시에 살고 있습니까? | 이동력 |  | [] | [] | [] | [] |
| | 1 | 무슨 곳? | | [] | | | | |
| | 1 | 무슨 동? | | | | | | |
| | 1 | 여기가 어디입니까? (예: 병원) | | | | | | |
| | 1 | 여기가 무엇을 하는 곳입니까? (예: 치료실) | | | | | | |
| 기억력 | 3 | 기억동록 세 가지 단어 즉시 따라하기 (나무, 자동차, 모자) | 기억회상(점수 없음) | 당시 듣고 있던 단어를 다시 말하 세요. | [] | [] | [] | [] |
| | 3 | 기억회상 5분 후 '아까 말한 세 가지 단어를 생각해서 말씀해주세요.' | | [] | [] | [] | [] | |
| 주의집중 및 계산 | 5 | 수리력 | 주의력 | 수리동록을 이용하여 가가 나한을 빼고, 100에서 7을 빼고, 100에서 7을 빼고, 100-7= 70-7= 63-7= 56-7= 49-7= 42-7= 35-7= 28-7= 21-7= 14-7= 7-7= 0-7= -7= -14-7= -21-7= -28-7= -35-7= -42-7= -49-7= -56-7= -63-7= -70-7= -77-7= -84-7= -91-7= -98-7= -105-7= -112-7= -119-7= -126-7= -133-7= -140-7= -147-7= -154-7= -161-7= -168-7= -175-7= -182-7= -189-7= -196-7= -203-7= -210-7= -217-7= -224-7= -231-7= -238-7= -245-7= -252-7= -259-7= -266-7= -273-7= -280-7= -287-7= -294-7= -301-7= -308-7= -315-7= -322-7= -329-7= -336-7= -343-7= -350-7= -357-7= -364-7= -371-7= -378-7= -385-7= -392-7= -399-7= -406-7= -413-7= -420-7= -427-7= -434-7= -441-7= -448-7= -455-7= -462-7= -469-7= -476-7= -483-7= -490-7= -497-7= -504-7= -511-7= -518-7= -525-7= -532-7= -539-7= -546-7= -553-7= -560-7= -567-7= -574-7= -581-7= -588-7= -595-7= -602-7= -609-7= -616-7= -623-7= -630-7= -637-7= -644-7= -651-7= -658-7= -665-7= -672-7= -679-7= -686-7= -693-7= -700-7= -707-7= -714-7= -721-7= -728-7= -735-7= -742-7= -749-7= -756-7= -763-7= -770-7= -777-7= -784-7= -791-7= -798-7= -805-7= -812-7= -819-7= -826-7= -833-7= -840-7= -847-7= -854-7= -861-7= -868-7= -875-7= -882-7= -889-7= -896-7= -903-7= -910-7= -917-7= -924-7= -931-7= -938-7= -945-7= -952-7= -959-7= -966-7= -973-7= -980-7= -987-7= -994-7= -1001-7= -1008-7= -1015-7= -1022-7= -1029-7= -1036-7= -1043-7= -1050-7= -1057-7= -1064-7= -1071-7= -1078-7= -1085-7= -1092-7= -1099-7= -1106-7= -1113-7= -1120-7= -1127-7= -1134-7= -1141-7= -1148-7= -1155-7= -1162-7= -1169-7= -1176-7= -1183-7= -1190-7= -1197-7= -1204-7= -1211-7= -1218-7= -1225-7= -1232-7= -1239-7= -1246-7= -1253-7= -1260-7= -1267-7= -1274-7= -1281-7= -1288-7= -1295-7= -1302-7= -1309-7= -1316-7= -1323-7= -1330-7= -1337-7= -1344-7= -1351-7= -1358-7= -1365-7= -1372-7= -1379-7= -1386-7= -1393-7= -1400-7= -1407-7= -1414-7= -1421-7= -1428-7= -1435-7= -1442-7= -1449-7= -1456-7= -1463-7= -1470-7= -1477-7= -1484-7= -1491-7= -1498-7= -1505-7= -1512-7= -1519-7= -1526-7= -1533-7= -1540-7= -1547-7= -1554-7= -1561-7= 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