
# Prise en charge de l'AVC chez le patient très âgé

Dr M Humbert
Service de gériatrie et réadaptation gériatrique
CHUV

# PLAN

1. PATIENTS ÂGÉS
2. MULTIMORBIDITÉ
3. FRAGILITÉ
4. ÉTAT CONFUSIONNEL

# PLAN

1. PATIENTS ÂGÉS


2. MULTIMORBIDITÉ
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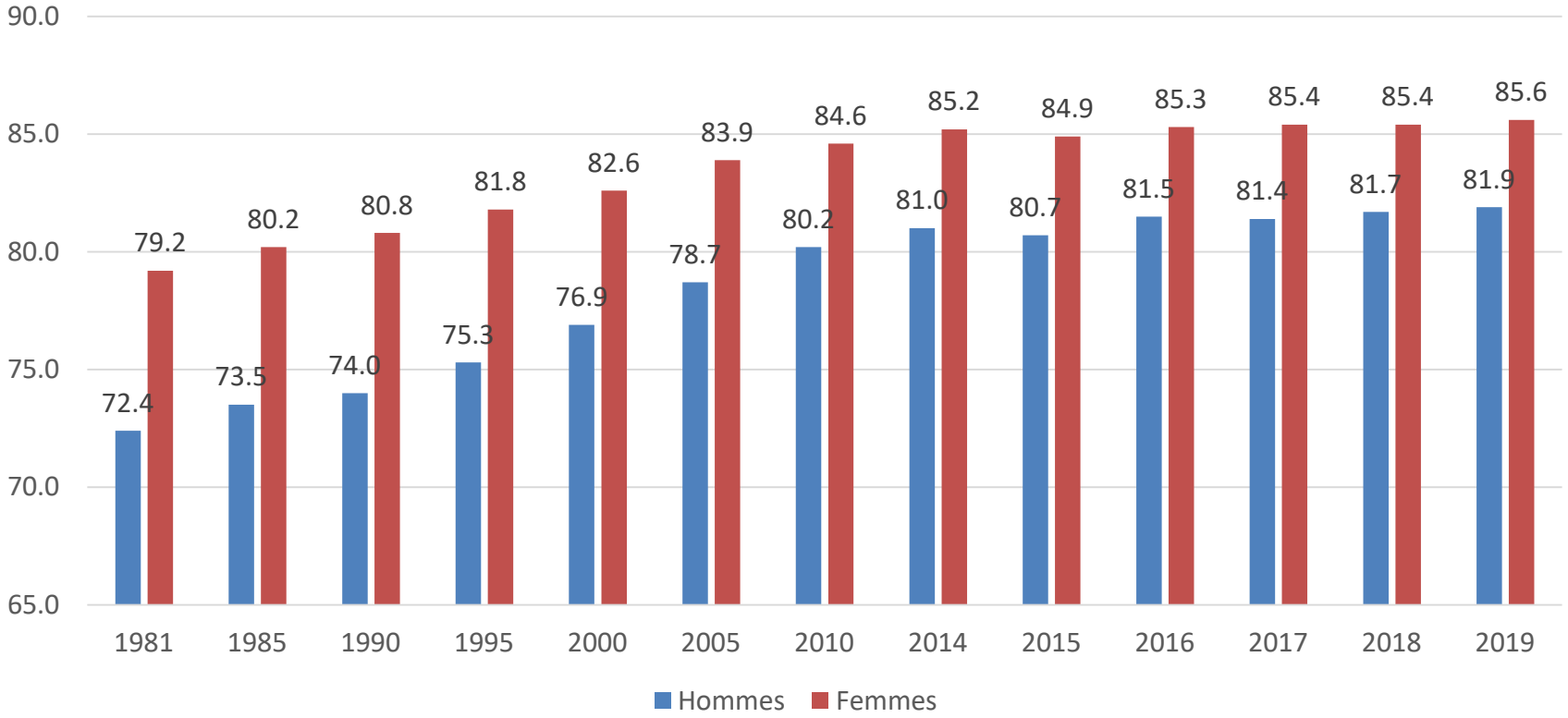
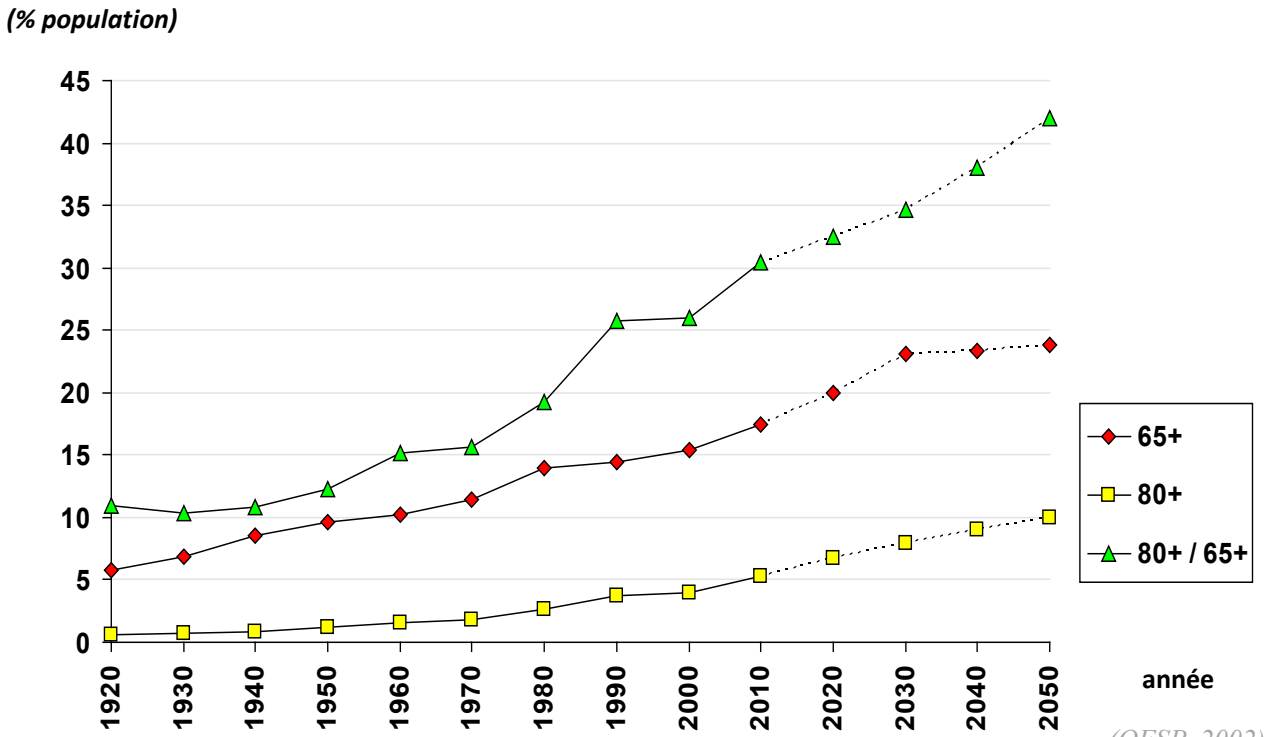
# ESPERANCE DE VIE : à la naissance en CH




*Source : OFS 09.2020*

# EVOLUTION DE LA POPULATION ÂGÉE EN SUISSE




(OFSP, 2002)

# AVC et âge

Stroke epidemiology Review

**Stroke epidemiology: a review of population-based studies of incidence, prevalence, and case-fatality in the late 20th century**

Valery L Feigin, Carlene MM Lawes, Derrick A Bennett, and Craig S Anderson

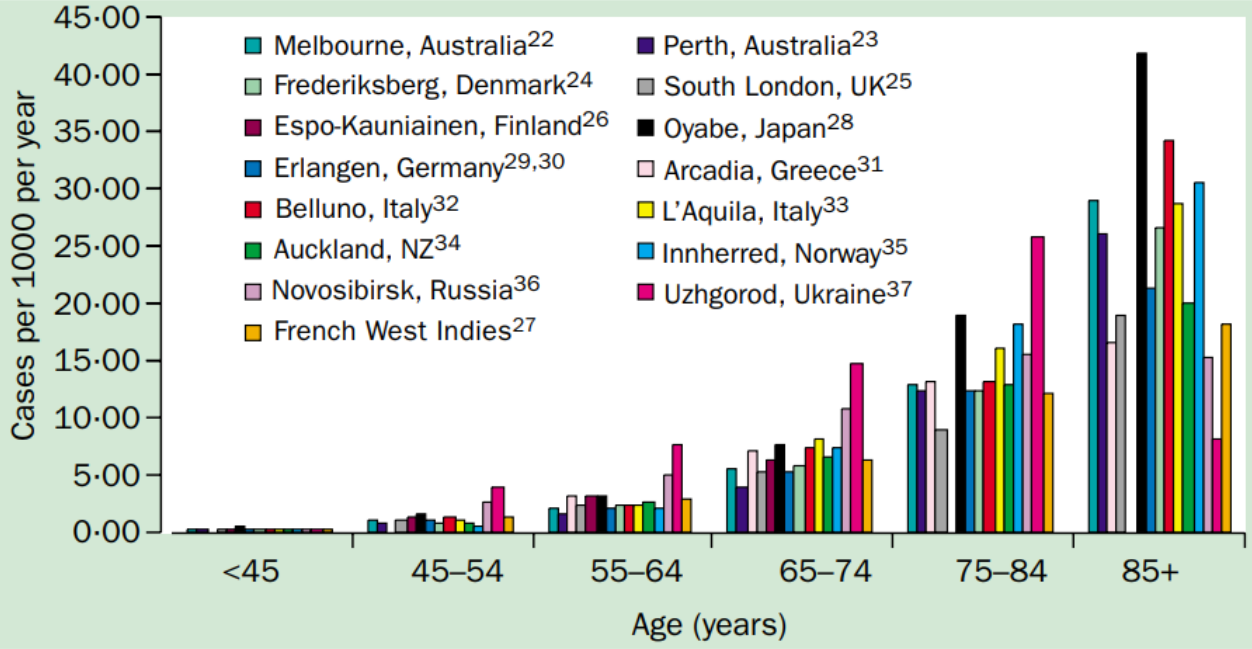
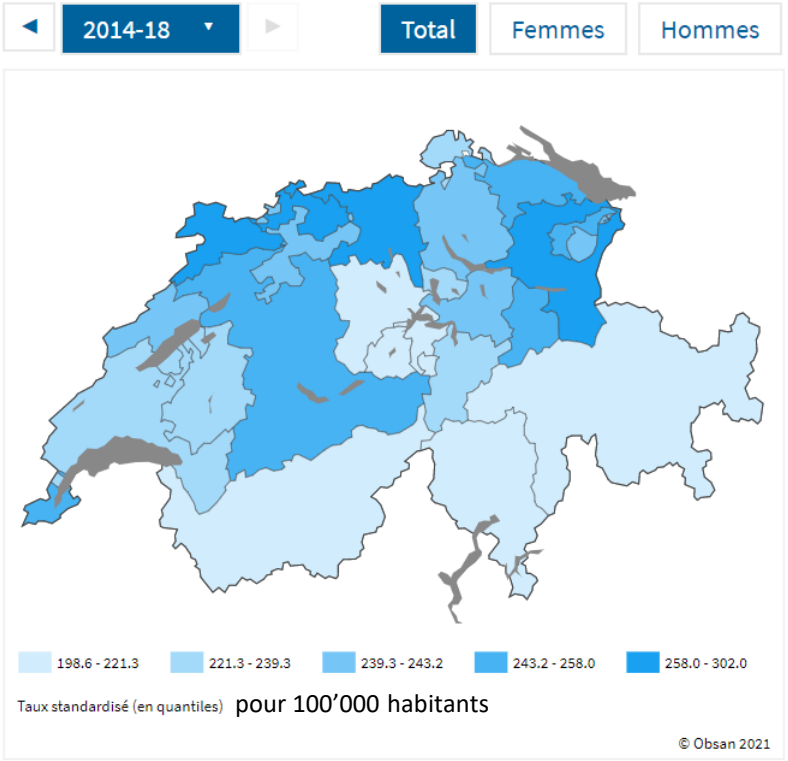
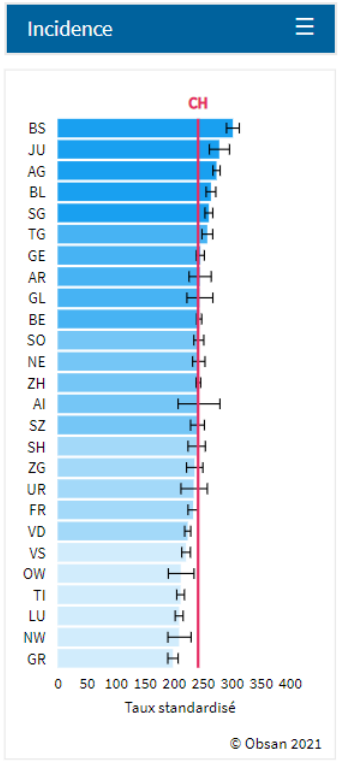


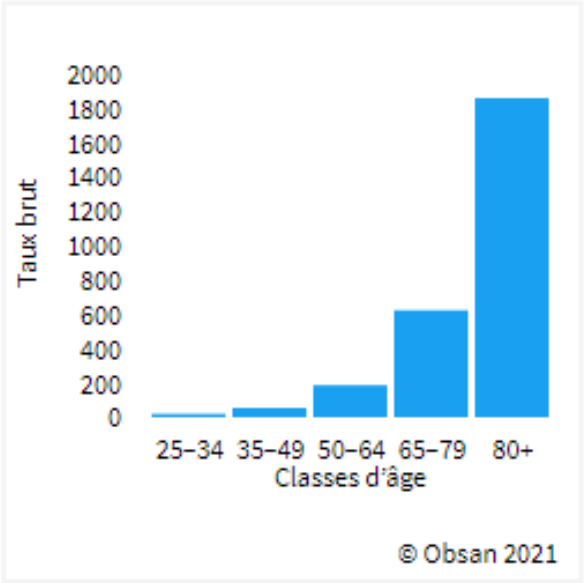

*Figure 3. Annual incidence by age per 1000 population of all types of stroke combined in selected studies.*

# AVC selon canton et âge en CH




pour 100’000 habitants



# Back to the future …

## Carte de poche thrombolyse

**Thrombolyse AVC ischémique : critères CHUV 11/2003**

Critères thrombolyse **intraveineuse**
AVC ischémique aigu selon le neurologue
Délai <=3h entre début symptômes et début ttt
Age 18 – 80 ans
NIHSS 6 - 25 selon le neurologue

Critères thrombolyse **intra-artérielle**
(Alternative : étude pour autre ttt aigu)
Délai 3-6h entre début symptômes et début ttt
Age 18-75 ans
NIHSS 6 - 25 selon le neurologue
Angio-CT : occlusion artérielle intracérébrale
(mais carotide extracrânienne non occluse)
CT de perfusion : pénombre importante


## Intravenous Tissue Plasminogen Activator for Acute Ischemic Stroke in Patients Aged 80 Years and Older

### The tPA Stroke Survey Experience

David Tanne, MD; Mark J. Gorman, MD; Vernice E. Bates, MD; Scott E. Kasner, MD; Phillip Scott, MD; Piero Verro, MD; Jeffrey R. Binder, MD; Jeffrey M. Dayno, MD; Lonni R. Schultz, PhD; Steven R. Levine, MD; and the tPA Stroke Survey Group

*Tanne D et al. Stroke 2000*

USA 13 hospitals
30 ≥ 80 yo patients vs 159 < 80 yo
No significance in ICH between 2 groups (3-7% 80 vs 2-9% <80)
Trend to higher in hospital mortality 80+ (OR 2.8 95%CI 0.81-9.68, p=0.10)
More nursing home 80+ (15% vs 5%)

*Age and Ageing* 2004; **33:** 143–149
DOI: 10.1093/ageing/afh031



## Is intravenous recombinant tissue plasminogen activator (rt-PA) safe for use in patients over 80 years old with acute ischaemic stroke? – The Calgary experience

Jessica E. Simon[1], David L. Sandler[2], J. H. Warwick Pexman[1], Michael D. Hill[1,3,4], Alastair M. Buchan[1] for the Calgary Stroke Programme

*Simon J et al., Age Ageing 2004*

Canada
Database search 1992-2002
62 patients ≥ 80 years treated with rtPA
In hospital mortality 24.2% and 3 months 32.8% - ICH 9.7%

HIGHLIGHT CME

## Thrombolysis in stroke patients aged 80 years and older: Swiss survey of IV thrombolysis

**Abstract**—This databank-based, multicenter study compared all stroke patients with IV tissue plasminogen activator aged ≥80 years (n = 38) and those <80 years old (n = 287). Three-month mortality was higher in older patients. Favorable outcome (modified Rankin scale ≤1) and intracranial hemorrhage (asymptomatic/symptomatic/fatal) were similarly frequent in both groups. Logistic regression showed that stroke severity, time to thrombolysis, glucose level, and history of coronary heart disease independently predicted outcome, whereas age did not.

NEUROLOGY 2005;65:1795–1798

S.T. Engelter, MD; M. Reichhart, MD; L. Sekoranja, MD; D. Georgiadis, MD; A. Baumann, MD; B. Weder, MD; F. Müller, MD; R. Lüthy, MD; M. Arnold, MD; P. Michel, MD; H.P. Mattle, MD; B. Tettenborn, MD; H.J. Hungerbühler, MD; R.W. Baumgartner, MD; R. Sztajzel, MD;

*Engelter S et al, Neurology 2005*

Swiss databank based multicenter cohort study – 1998-2003
325 rtPA patients – 12% ≥ 80 years old vs 287 < 80 years old
3 months mortality higher for 80+ (32% vs 12%) – No significant difference ICH

## Intravenous Alteplase for Stroke in Those Older Than 80 Years Old

Gary A. Ford, FRCP; Niaz Ahmed, MD; Elsa Azevedo, MD; Martin Grond, MD; Vincent Larrue, MD; Perttu J. Lindsberg, PhD; Danilo Toni, PhD; Nils Wahlgren, MD

*Ford G, Stroke 2010*

31 pays
1831 patients >80 (median 83 y) vs 19'411 patients ≤80 (median 68 y)
>80 had NIHSS 14 vs 12 – lower pre-stroke Rankin
>80 ↑mortality 30% vs 12% and ↓ independance and no significant ICH increase

# AHA/ASA Guideline

## 2018 Guidelines for the Early Management of Patients With Acute Ischemic Stroke

### A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association

**Table 6. Eligibility Recommendations for IV Alteplase in Patients With AIS**

| Indications (Class I) | |
|---|---|
| Within 3 h* | IV alteplase (0.9 mg/kg, maximum dose 90 mg over 60 min with initial 10% of dose given as bolus over 1 min) is recommended for selected patients who may be treated within 3 h of ischemic stroke symptom onset or patient last known well or at baseline state. Physicians should review the criteria outlined in this table to determine patient eligibility.† (*Class I; LOE A*) |
| Age | For otherwise medically eligible patients ≥18 y of age, IV alteplase administration within 3 h is equally recommended for patients <80 and >80 y of age.† (*Class I; LOE A*) |


# rTPA

**Outcomes of Thrombolysis for Acute Ischemic Stroke in Octogenarians Versus Nonagenarians**

Farrah J. Mateen, MD; Alastair M. Buchan, MD; Michael D. Hill, MD; on behalf of the CASES Investigators

*Mateen F et al. Stroke 2010*

Canada – 60 center Canadian ischemic stroke treatment network
28 nonagenarians vs 242 octogenarians treated with rtPA
NIHSS >15 : 58% for 90+ and 52% for octogenarians
ICH : 90+ = 7% vs octo = 4% (p=0.359)
90 days mortality : 90+= 52% vs octo =33% (p=0.087)
Favorable outcome (mRS≤1) : 90+ = 30% vs octo = 0.647 (p=0.647)

**Intravenous Thrombolysis in Nonagenarians With Ischemic Stroke**

Hakan Sarikaya, MD; Marcel Arnold, MD; Stefan T. Engelter, MD; Philippe A. Lyrer, MD; Patrik Michel, MD; Céline Odier, MD; Bruno Weder, MD; Barbara Tettenborn, MD; Felix Mueller, MD; Lucka Sekoranja, MD; Roman Sztajzel, MD; Pietro Ballinari, PhD*; Heinrich P. Mattle, MD; Ralf W. Baumgartner, MD

*Sarikaya H et al. Stroke 2011*

CH – 7 stroke units
284 patients : 46 nonagenarians + 238 octogenarians
Mortality : 90+ = 45.2% vs octo = 22.1% (p=0.002)
ICH : 90+ = 13.4 % vs octo 4.7% (p=0.037)

**Outcomes of Nonagenarians with Acute Ischemic Stroke Treated with Intravenous Thrombolytics**

*Behrouz R et al., JStrokeCerebrovascDis 2018*

ITAS 90+ registry : Europe-USA-SouthAmerica 2007-2015
227 nonagenarians independants – 92.7 ± 2.5 y – 74% female - independants – Rankin > 2
122 rtPA vs 105 no rtPA
In hospital mortality : rtPA = 27% vs no rtPA = 19%, p=0.155
90 days mortality : rtPA = 43% vs no rTPA = 22%, p=0.82
ICH : rtPA = 4.9% vs no rtPA = 3.8%, p=0.594
rtPA → lower disability

RESEARCH ARTICLE Open Access

**The impact of intravenous thrombolysis on outcome of patients with acute ischemic stroke after 90 years old**

S. Sagnier[1], P. Galli[1,2], M. Poli[1], S. Debruxelles[1], P. Renou[1], S. Olindo[1], F. Rouanet[1] and I. Sibon[1,2*]

*Sagnier S et al., BMC Ger 2016*

Bordeaux F – 2012-2015
Retrospective study
78 patients – 92 ± 1.7 years old - 37 rtPA ans 41 no rtPA
No significant difference 3 months mRS
ICH : rtPA 54% vs no rtPA 12%, p=0.002


# Thrombectomy

Ischemic stroke

ORIGINAL RESEARCH

## Endovascular treatment of acute ischemic stroke in nonagenarians compared with younger patients in a multicenter cohort

Muhib A Khan,[1,2] Grayson L Baird,[3,4] David Miller,[1] Anand Patel,[5] Shawn Tsekhan,[1] Shadi Yaghi,[1] Ajit Puri,[6] Mahesh Jayaraman,[4] Nils Henninger,[5,7] Brian Silver[1]

*Khan M et al. J NeuroIntSurg_2017*

USA, 2 Stroke centers

193 patients : 18 ≥ 90 yo and 175 19-89 years old

**Conclusions** Nonagenarians are at a substantially higher risk of a poor 90-day outcome after EVT than younger patients. However, a small subset of nonagenarians may benefit from EVT, particularly if they have a good pre-stroke functional status. Further research is needed to identify factors associated with favorable outcome in this age cohort.

**Mechanical thrombectomy in stroke in nonagenarians: useful or futile?**

Mafalda Mendes Pinto,* Ana Paiva Nunes,† Marta Alves,‡‖ Ana Luísa Papoila,‡‖ Jaime Pamplona,§‖ Rui Carvalho,§‖ Mariana Baptista,§‖ João Reis,§‖ and Isabel Fragata,§‖

*Pinto M et al. JStrokeCerebrovDis 2020*

Lisboa – 2016-2018

144 patients ≥ 80 yo (128 octogenarians vs 16 nonagenarians)

ICH : octo = 3.1% vs nona = 6.3% (p=0.520)

3 months mRS ≤ 2 : octo 22.6% vs nona 31.3% (p=0.445)

3 months mortality : octo 33.9% vs non 37.5% (p=0.773)

→ No significant difference


# Thrombectomy

**Impact of Reperfusion for Nonagenarians Treated by Mechanical Thrombectomy**
**Insights From the ETIS Registry**
*Drouard E. et al, Stroke 2019*

7 stroke centers (ETIS Registry) France 2013-2018
124 patients ≥ 90
90 days : 34.4% dead
23.5% mRS 0-2
ICH in 24h : 28.2% but only 4% symptomatic

Ischemic Stroke

ORIGINAL RESEARCH

**Mechanical thrombectomy in nonagenarians with acute ischemic stroke**

*Meyer L et al., JNeuroInterSurg 2019*

Germany – 3 Neurointervention centers – 2013-2017
79 patients ≥ 90 yo – 80% women - Median NIHSS 17
16% 90 days mRS ≤ 2
In hospital mortality : 30.7% and 90 days mortality 46.7%

Cerebrovascular Diseases

Original Paper

Cerebrovasc Dis 2005;20:233–238
DOI: 10.1159/000087704

Received: February 22, 2005
Accepted: May 19, 2005
Published online: August 22, 2005

# Hypertension and Stroke in Centenarians, Okinawa, Japan

Masashi Arakawa[a] Yoshihiro Miyake[a] Kazuhiko Taira[b]

[a]Department of Public Health, Fukuoka University School of Medicine, Fukuoka, and [b]Department of Lifelong Health Promotion, College of Education, University of the Ryukyus, Okinawa, Japan

*Arakawa M et al. Cerebrovasc Dis 2005*

Okinawa prefecture – 2004 Cross sectional study
1378 women and 266 men
Lifetime prevalence of stroke = 11% for centenarians
1st stroke : 1 ≤ 80yo = 1.1% – 81-90 yo = 2.4% - 90+ = 7.4%

**Table 2.** ORs and 95% CIs of stroke in relation to selected factors in 1,644 centenarians, Okinawa, Japan

| Factors | Prevalence | Crude OR | Adjusted OR[1] |
|---|---|---|---|
| Sex | | | |
| Male | 25/266 (9.3) | 1.00 | 1.00 |
| Female | 155/1,378 (11.2) | 1.22 (0.80–1.95) | 0.95 (0.56–1.66) |
| Hypertension | | | |
| Never | 87/1,165 (7.5) | 1.00 | 1.00 |
| Ever | 93/479 (19.4) | 2.99 (2.18–4.09) | 2.97 (2.16–4.08) |
| Cigarette smoking | | | |
| Never | 139/1,206 (11.5) | 1.00 | 1.00 |
| Ever | 41/438 (9.4) | 0.79 (0.54–1.13) | 0.87 (0.58–1.28) |
| Alcohol intake | | | |
| Never | 160/1,436 (11.1) | 1.00 | 1.00 |
| Ever | 20/208 (9.6) | 0.85 (0.51–1.35) | 0.97 (0.52–1.73) |

Figures in parentheses indicate 95% CIs or percentages.
[1] Adjusted for covariates listed in the table.

Geriatrics Gerontology International — Medline Indexed

*Geriatr Gerontol Int 2014; 14: 84–88*

ORIGINAL ARTICLE: EPIDEMIOLOGY, CLINICAL PRACTICE AND HEALTH

## Stroke in centenarians

Tom Skyhøj Olsen[1] and Klaus Kaae Andersen[2]

*Olsen T et al., GeriatrGerontInt 2014*

Danish stroke registry 2000-2010 (61 935 stroke patients)
39 centenarians : 82% women, 82% living alone, 64% in their own home
Lower prevalence of cardiovasc. risk factors in 100+ (!!)
1 month mortality = higher

BRIEF REPORT

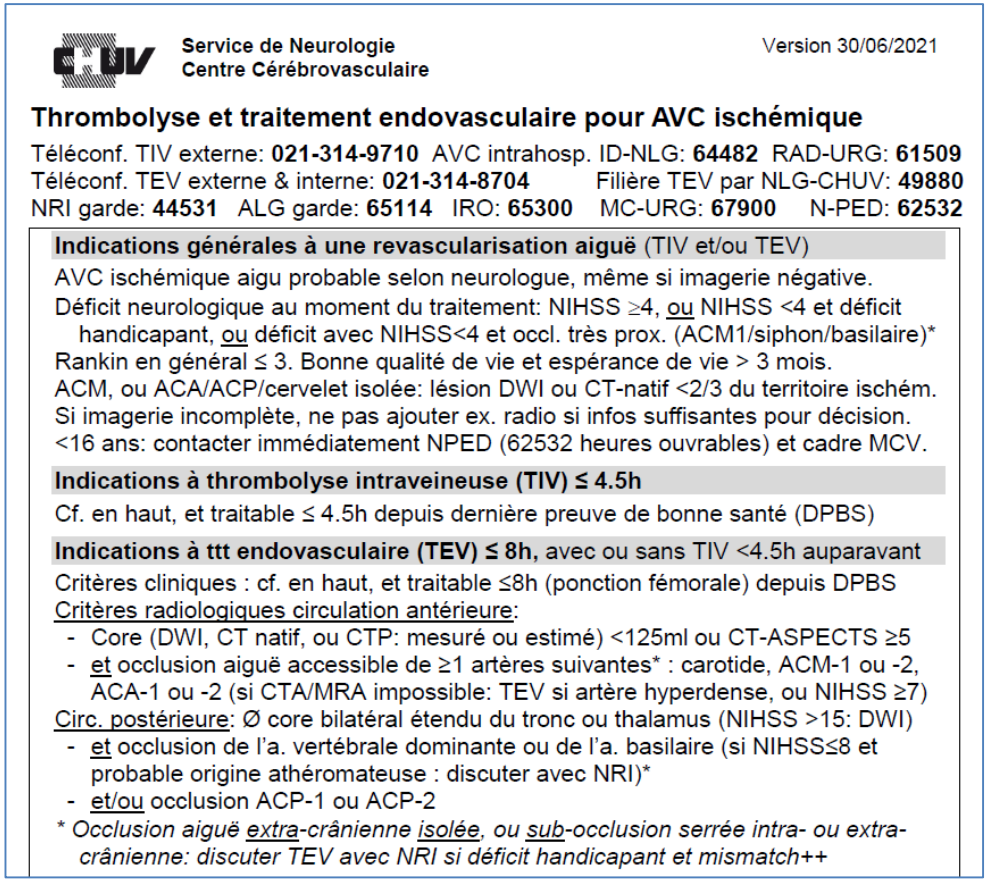
## Intravenous thrombolysis for acute ischemic stroke in centenarians

B. Baena Álvarez[1] · S. García-Madrona[1,2] · R. Sainz Amo[1] · F. Rodríguez Jorge[1] · J. Gómez Corral[1] · R. Vera Lechuga[1] · M. C. Matute Lozano[1] · A. Sánchez Sánchez[1] · A. De Felipe Mimbrera[1] · A. Cruz Culebras[1] · J. Masjuan Vallejo[1,2]

*Baena Alvarez B et al., EuroGerMed 2021*

Madrid 2010 – 2020
4 patients > 100 years old
2 with mRS = 0 and 2 with mRS = 2
Median NIHSS 21 (15-23)
No ICH
LOS 6 days
1 death due to pneumonia (25%)
3 discharged home (!)

# Plus de limite d'âge supérieure depuis 2006 au CHUV



Service de Neurologie
Centre Cérébrovasculaire

Version 30/06/2021

**Thrombolyse et traitement endovasculaire pour AVC ischémique**

Téléconf. TIV externe: **021-314-9710** AVC intrahosp. ID-NLG: **64482** RAD-URG: **61509**
Téléconf. TEV externe & interne: **021-314-8704** Filière TEV par NLG-CHUV: **49880**
NRI garde: **44531** ALG garde: **65114** IRO: **65300** MC-URG: **67900** N-PED: **62532**

**Indications générales à une revascularisation aiguë** (TIV et/ou TEV)

AVC ischémique aigu probable selon neurologue, même si imagerie négative.
Déficit neurologique au moment du traitement: NIHSS ≥4, ou NIHSS <4 et déficit handicapant, ou déficit avec NIHSS<4 et occl. très prox. (ACM1/siphon/basilaire)*
Rankin en général ≤ 3. Bonne qualité de vie et espérance de vie > 3 mois.
ACM, ou ACA/ACP/cervelet isolée: lésion DWI ou CT-natif <2/3 du territoire ischém.
Si imagerie incomplète, ne pas ajouter ex. radio si infos suffisantes pour décision.
<16 ans: contacter immédiatement NPED (62532 heures ouvrables) et cadre MCV.

**Indications à thrombolyse intraveineuse (TIV) ≤ 4.5h**

Cf. en haut, et traitable ≤ 4.5h depuis dernière preuve de bonne santé (DPBS)

**Indications à ttt endovasculaire (TEV) ≤ 8h,** avec ou sans TIV <4.5h auparavant

Critères cliniques : cf. en haut, et traitable ≤8h (ponction fémorale) depuis DPBS
Critères radiologiques circulation antérieure:
- Core (DWI, CT natif, ou CTP: mesuré ou estimé) <125ml ou CT-ASPECTS ≥5
- et occlusion aiguë accessible de ≥1 artères suivantes* : carotide, ACM-1 ou -2, ACA-1 ou -2 (si CTA/MRA impossible: TEV si artère hyperdense, ou NIHSS ≥7)

Circ. postérieure: Ø core bilatéral étendu du tronc ou thalamus (NIHSS >15: DWI)
- et occlusion de l'a. vertébrale dominante ou de l'a. basilaire (si NIHSS≤8 et probable origine athéromateuse : discuter avec NRI)*
- et/ou occlusion ACP-1 ou ACP-2

** Occlusion aiguë extra-crânienne isolée, ou sub-occlusion serrée intra- ou extra-crânienne: discuter TEV avec NRI si déficit handicapant et mismatch++*

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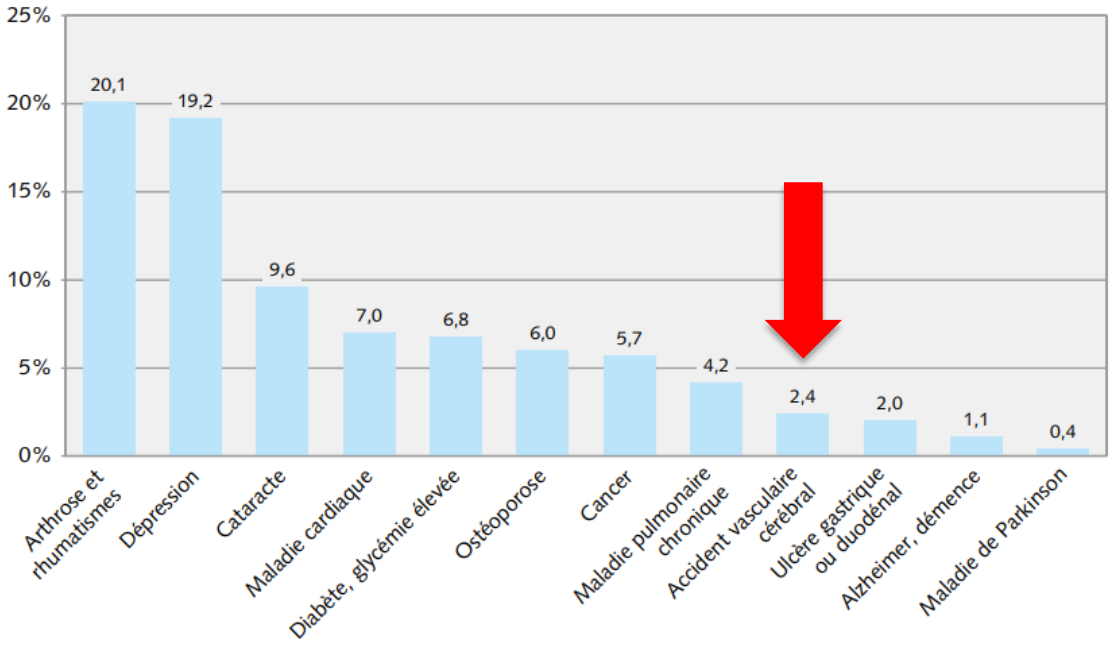
# MULTIMORBIDITE

OBSAN **BULLETIN 4/2013**

**La multimorbidité chez les personnes de 50 ans et plus**

**Résultats basés sur l'enquête SHARE**

**Prévalence de chaque maladie chronique, SHARE 2010–2011, personnes de 50 ans et plus, N=3761** **Fig. 1**




Source: Enquête SHARE 2010–2011, analyses Obsan

# MULTIMORBIDITE

Cross sectional study
Scotland 2007
1'751'841 patients

**Epidemiology of multimorbidity and implications for health care, research, and medical education: a cross-sectional study**

*Karen Barnett, Stewart W Mercer, Michael Norbury, Graham Watt, Sally Wyke, Bruce Guthrie*

| | n (%) | Mean number of morbidities (SD)* | Percentage (95% CI) with multimorbidity† | Percentage (95% CI) with physical–mental health comorbidity† |
|---|---|---|---|---|
| All patients | 1751841 (100%) | 0·96 (1·56) | 23·2% (23·1–23·2) | 8·34% (8·3–8·4) |
| Sex | | | | |
| Female | 884420 (50·5%) | 1·09 (1·65) | 26·2% (26·1–26·3) | 10·2% (10·2–10·3) |
| Male | 867421 (49·5%) | 0·84 (1·46) | 20·1% (20·0–20·1) | 6·4% (6·4–6·5) |
| Age, years | | | | |
| 0–24 | 479156 (27·4%) | 0·16 (0·44) | 1·9% (1·9–2·0) | 0·5% (0·5–0·6) |
| 25–44 | 508389 (29·0%) | 0·50 (0·92) | 11·3% (11·2–11·4) | 5·7% (5·6–5·7) |
| 45–64 | 473127 (27·0%) | 1·18 (1·50) | 30·4% (30·2–30·5) | 12·4% (12·3–12·5) |
| 65–84 | 254600 (14·5%) | 2·60 (2·09) | 64·9% (64·7–65·1) | 17·5% (17·4–17·7) |
| ≥85 | 36569 (2·1%) | 3·62 (2·30) | 81·5% (81·1–81·9) | 30·8% (30·3–31·3) |

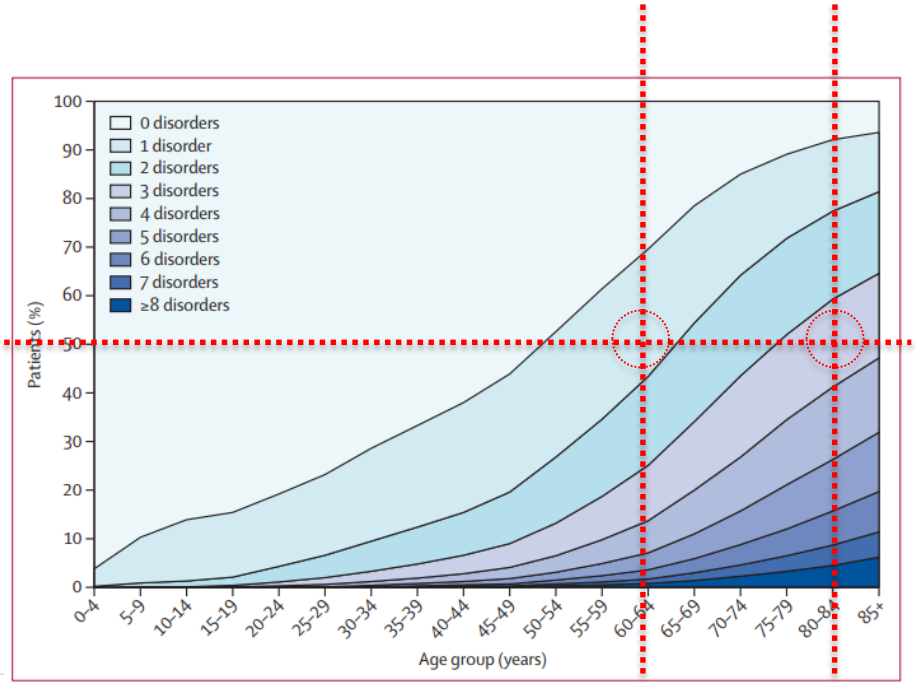



*Figure 1:* **Number of chronic disorders by age-group**

canton de vaud

*Barnett, Lancet 2012*

# MULTIMORBIDITE

BMJ

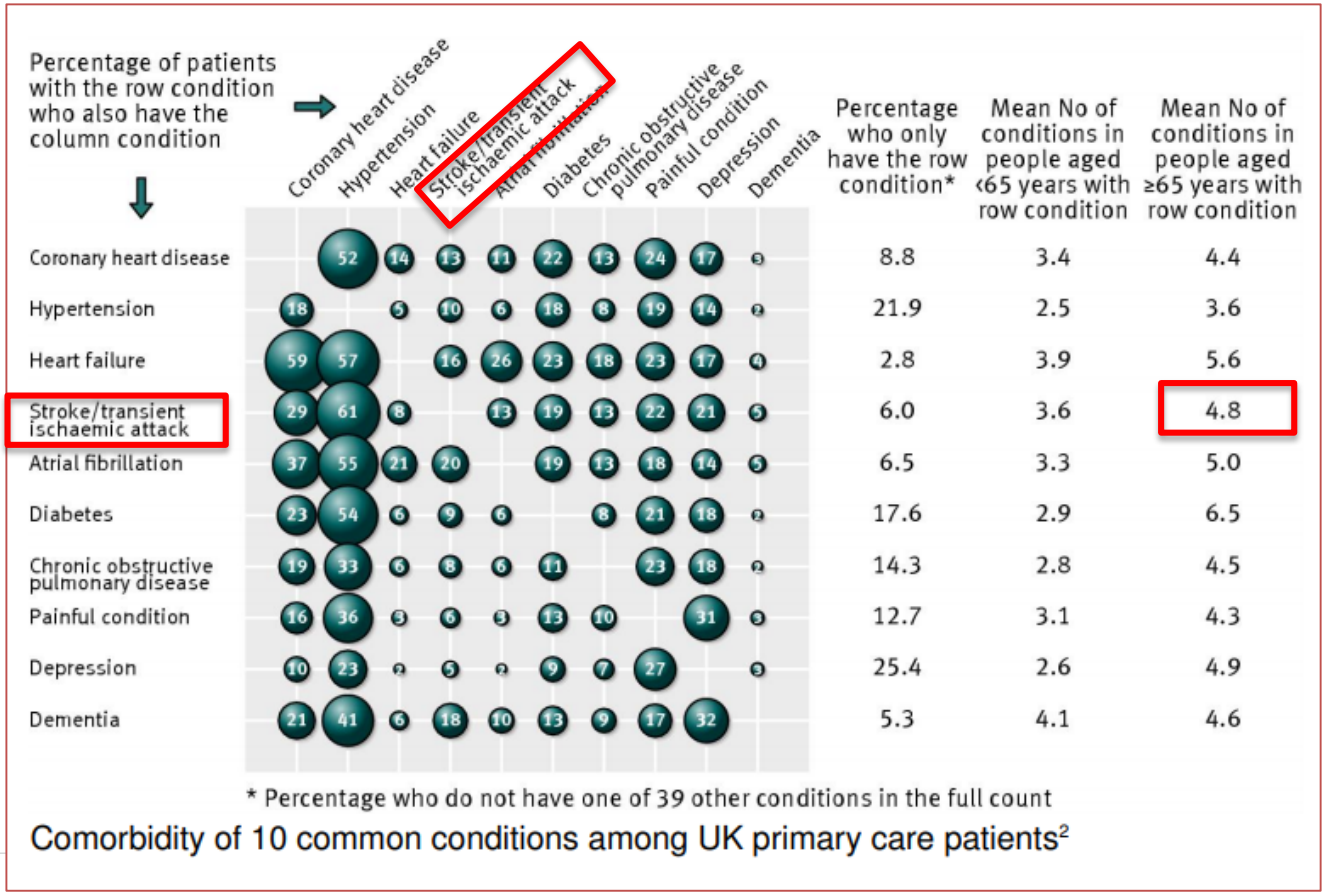
BMJ 2012;345:e6341 doi: 10.1136/bmj.e6341 (Published 4 October 2012)



**ANALYSIS**

**Adapting clinical guidelines to take account of multimorbidity**

*Figure établie à partir des données de Barnett 2012*




*Guthrie, BMJ 2012*

# MULTIMORBIDITE

Mount Sinai Beth Israel Hospital
Retrospective chart review
2010-2015
1457 patients (33% over 80 years old)

**Epidemiology and Outcomes of Ischemic Stroke and Transient Ischemic Attack in the Adult and Geriatric Population**

Allison Navis, MD, Rocio Garcia-Santibanez, MD, and Maryna Skliut, MD

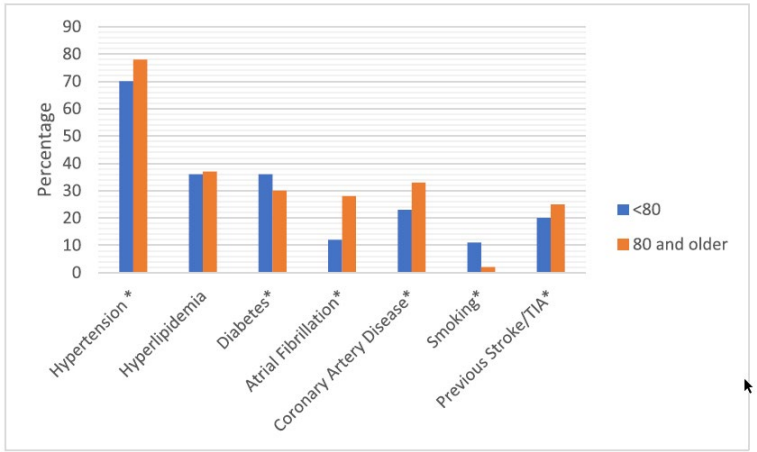



**Figure 1.** *Comorbidities* (*P < .05).

*Navis A et al. J Stroke Cerebrovasc Diseases 2019*

# OUTCOME

Mount Sinai Beth Israel Hospital
Retrospective chart review
2010-2015
1457 patients (33% over 80 years old)

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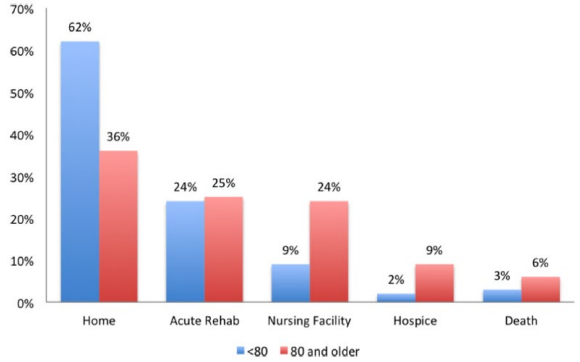


**Figure 3.** *Disposition on discharge between age groups for patients with ischemic stroke who did not receive intravenous tPA. Abbreviation: tPA, tissue-type plasminogen activator.*

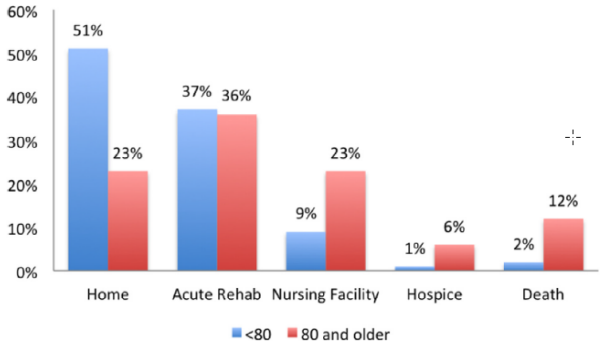


**Figure 4.** *Disposition on discharge between age groups for patients with ischemic stroke who did receive intravenous tPA. Abbreviation: tPA, tissue-type plasminogen activator.*

*Navis A et al. J Stroke Cerebrovasc Diseases 2019*

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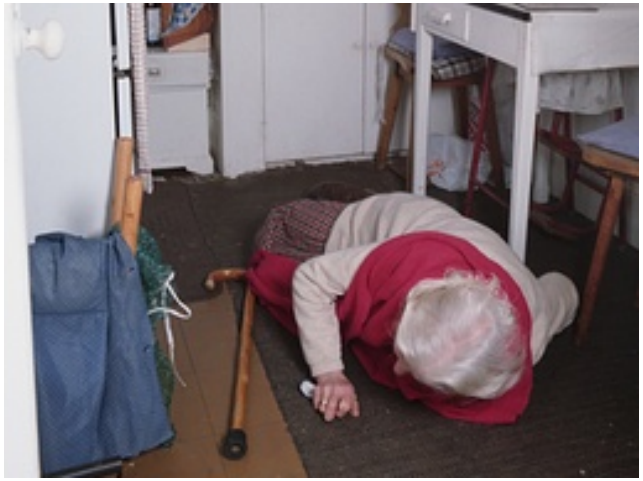
# HÉTÉROGÉNÉITÉ POPULATION ÂGÉE



# SYNDROMES GERIATRIQUES

## MÉMOIRE
TROUBLES DE LA MÉMOIRE
ÉTAT CONFUSIONNEL

## MORAL
DÉPRESSION
TROUBLES DU SOMMEIL

## MOBILITÉ
TROUBLES DE L'ÉQUILIBRE
CHUTES
IMMOBILITÉ

## MANGER
DENUTRITION
TROUBLES DEGLUTITION
PROBLÈMES DENTAIRES

## MAISON
DÉCLIN FONCTIONNEL
PERTE INDÉPENDANCE

## MÉDICAMENTS
POLYMÉDICATION (≥5)
EFFETS SECONDAIRES

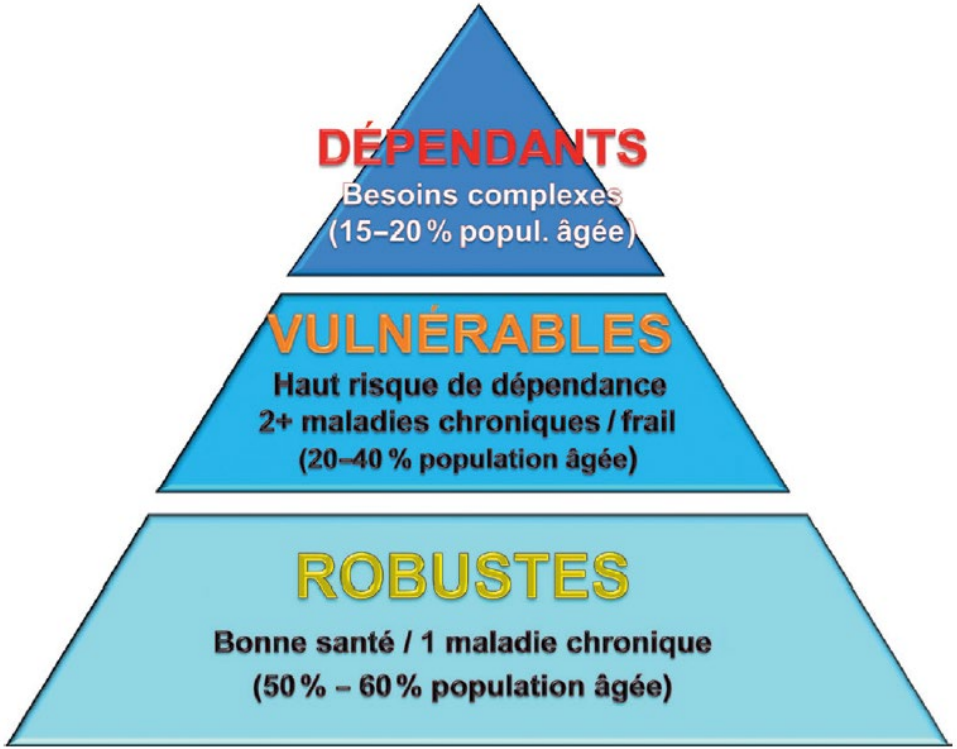
## MICTION
INCONTINENCE
- URINAIRE
- FÉCALE

## MAL...
...VOYANT
...ENTENDANT

TROUBLES VISION
TROUBLES AUDITION

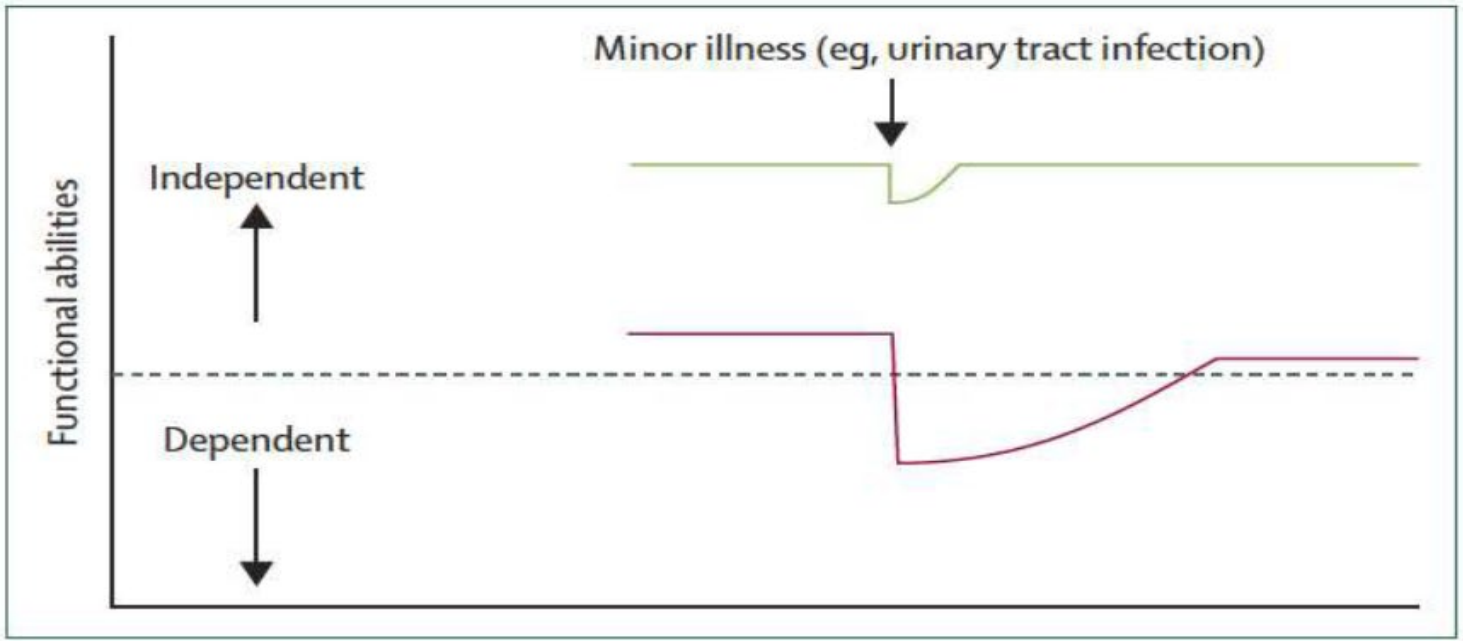
## MULTI...
CAUSES MULTIFACTORIELLES

# HÉTÉROGÉNÉITÉ POPULATION ÂGÉE




*Büla CJ, Beetschen P, David S,* et al. *Politique Vieillissement et Santé, État de Vaud, avril 2012.*

# FRAGILITE




*Clegg A., Lancet 2013*

# FRAGILITE

## Frailty in elderly people

*Andrew Clegg, John Young, Steve Iliffe, Marcel Olde Rikkert, Kenneth Rockwood*

Frailty is the most problematic expression of population ageing. It is a state of vulnerability to poor resolution of homoeostasis after a stressor event and is a consequence of cumulative decline in many physiological systems during a lifetime. This cumulative decline depletes homoeostatic reserves until minor stressor events trigger disproportionate changes in health status. In landmark studies, investigators have developed valid models of frailty and these models have allowed epidemiological investigations that show the association between frailty and adverse health outcomes.

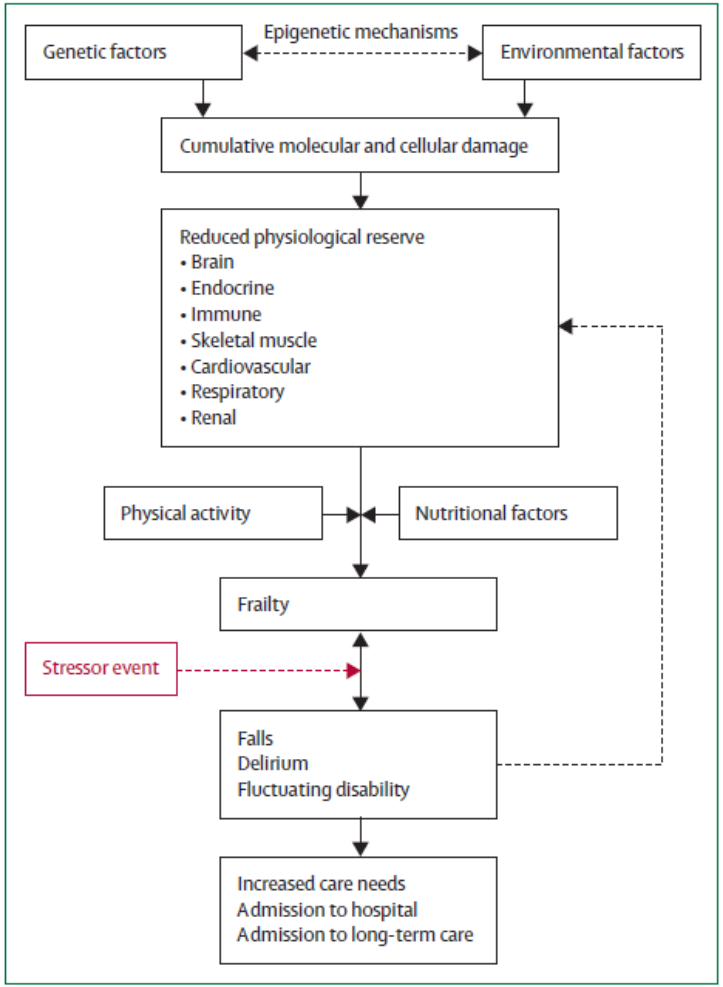



***Figure 2*: Schematic representation of the pathophysiology of frailty**

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# FRAGILITE

Frailty in elderly people
Andrew Clegg, John Young, Steve Iliffe, Marcel Olde Rikkert, Kenneth Rockwood

## PREDICTEUR D'OUTCOMES DEFAVORABLES

| | Year | Country | Participants (n) | Length of follow-up (years) | Falls (HR*/OR† [95% CI]) | | Worsening disability (HR*/OR† [95% CI]) | | Hospitalisation (HR*/OR† [95% CI]) | | Care home admission (HR*/OR† [95% CI]) | | Mortality (HR*/OR† [95% CI]) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Inter-mediate frailty | Severe frailty | Inter-mediate frailty | Severe frailty | Inter-mediate frailty | Severe frailty | Inter-mediate frailty | Severe frailty | Inter-mediate frailty | Severe frailty |
| Cardiovascular Health Study (CHS)[3] | 2001 | USA | 5317 | 7 | 1·12* (1·00–1·26) | 1·23* (0·99–1·54) | 1·55* (1·38–1·75) | 1·79* (1·47–2·17) | 1·11* (1·03–1·19) | 1·27*, (1·11–1·46) | NA | NA | 1·32* (1·13–1·55) | 1·63* (1·27–2·08) |
| Canadian Study of Health and Aging (CSHA)[92] | 2004 | Canada | 9008 | 5 | NA | NA | NA | NA | NA | NA | 2·54 † (1·67–3·86) | 2·60† (1·36–4·96) | 2·54† (1·92–3·37) | 3·69† (2·26–6·02) |
| Women's Health and Aging Study (WHAS)[93] | 2006 | USA | 1438 | 3 | 0·92* (0·63–1·64) | 1·18* (0·63–2·19) | NA | NA | 0·99* (0·67–1·47) | 0·67* (0·33–1·35) | 5·16* (0·81–32·79) | 23·98* (4·45–129·2) | 3·50* (1·91–6·39) | 6·03* (3·00–12·08) |
| Study of Osteoporotic Fractures (SOF)[94] | 2008 | USA | 6701 | 4·5 | 1·23† (1·02–1·48) | 2·44† (1·95–3·04) | 1·89†, (1·66–2·14) | 2·79† (2·31–3·37) | NA | NA | NA | NA | 1·54† (1·40–1·69) | 2·75* (2·46–3·07) |

HR=hazard ratio. NA=not available. OR=odds ratio. *Hazard ratio. †Odds ratio. The comparator for hazard ratios and odds ratios is people who are not frail.

***Table*: Covariate-adjusted associations between frailty and adverse outcomes (falls, disability, hospitalisation, care home admission, and mortality) from four large prospective cohort studies**

*Clegg A., Lancet 2013*

# FRAGILITE : FRIED

Cardiovascular Health Study
USA 1989-90
5317 patients
≥ 65 years old

Frailty in Older Adults: Evidence for a Phenotype

Linda P. Fried,[1] Catherine M. Tangen,[2] Jeremy Walston,[1] Anne B. Newman,[3] Calvin Hirsch,[4] John Gottdiener,[5] Teresa Seeman,[6] Russell Tracy,[7] Willem J. Kop,[8] Gregory Burke,[9] and Mary Ann McBurnie[2] for the Cardiovascular Health Study Collaborative Research Group

## CRITÈRES CLINIQUES SELON FRIED :

1. PERTE DE POIDS
2. FORCE DIMINUÉE
3. FATIGUE SUBJECTIVE
4. VITESSE DE MARCHE RALENTIE
5. FAIBLE ACTIVITÉ PHYSIQUE

Table 1. Operationalizing a Phenotype of Frailty

| A. *Characteristics of Frailty* | B. *Cardiovascular Health Study Measure** |
|---|---|
| Shrinking: Weight loss (unintentional) Sarcopenia (loss of muscle mass) | Baseline: >10 lbs lost unintentionally in prior year |
| Weakness | Grip strength: lowest 20% (by gender, body mass index) |
| Poor endurance; Exhaustion | "Exhaustion" (self-report) |
| Slowness | Walking time/15 feet: slowest 20% (by gender, height) |
| Low activity | Kcals/week: lowest 20%<br>males: <383 Kcals/week<br>females: <270 Kcals/week |
| | C. *Presence of Frailty* |
| | Positive for frailty phenotype: ≥3 criteria present |
| | Intermediate or prefrail: 1 or 2 criteria present |

*Fried L. et al, J Gerontol Med Sci 2001*

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# FRAGILITE et AVC

**Factors Associated With Ischemic Stroke Survival and Recovery in Older Adults**

Divya Thekkethala Winovich, MPH; William T. Longstreth, Jr, MD, MPH; Alice M. Arnold, PhD; Ravi Varadhan, PhD; Adina Zeki Al Hazzouri, PhD; Mary Cushman, MD, MSc; Anne B. Newman, MD, MPH; Michelle C. Odden, PhD

Cardiovascular Health Study
5888 patients ≥ 65 years old USA
717 patients with Stroke
Fried model

**Table 2. Risk Factors for Shorter Survival Among Participants With Incident Ischemic Stroke**

| | | Unadjusted* | | | | Fully Adjusted† | | |
|---|---|---|---|---|---|---|---|---|
| | n‡ | HR (95% CI) | *P* Value | Int.§ | n‡ | HR (95% CI) | *P* Value | Int.§ |
| Pre-Frail | | | | | | | | |
| <80 y | 300 | 1.48 (1.13–1.94) | 0.003 | 0.20 | 294 | 1.64 (1.23–2.18) | 0.001 | 0.04 |
| ≥80 y | 232 | 1.11 (0.78–1.57) | 0.57 | | 221 | 0.99 (0.68–1.46) | 0.96 | |
| Frail | | | | | | | | |
| <80 y | 300 | 2.08 (1.38–3.13) | <0.001 | 0.05 | 294 | 2.03 (1.31–3.16) | 0.002 | 0.06 |
| ≥80 y | 232 | 1.18 (0.79–1.76) | 0.43 | | 221 | 1.13 (0.71–1.80) | 0.61 | |
| CRP‖ | 616 | 1.05 (0.99–1.10) | 0.11 | | 606 | 1.05 (0.99–1.12) | 0.08 | |
| IL-6‖ | | | | | | | | |
| <80 y | 294 | 1.47 (1.30–1.67) | <0.001 | 0.007 | 292 | 1.41 (1.23–1.62) | <0.001 | 0.03 |
| ≥80 y | 291 | 1.13 (0.97–1.30) | 0.12 | | 285 | 1.12 (0.95–1.31) | 0.17 | |
| Cystatin C‖ | 578 | 2.24 (1.81–2.77) | <0.001 | | 568 | 1.97 (1.55–2.50) | <0.001 | |
| Systolic blood pressure# | 637 | 1.01 (0.97–1.04) | 0.62 | | 622 | 1.02 (0.98–1.05) | 0.39 | |
| Diastolic blood pressure# | 637 | 0.96 (0.90–1.03) | 0.23 | | 622 | 0.99 (0.92–1.06) | 0.79 | |
| Total cholesterol¶ | | | | | | | | |
| <80 y | 312 | 0.99 (0.96–1.03) | 0.70 | 0.02 | 309 | 1.02 (0.98–1.05) | 0.36 | 0.10 |
| ≥80 y | 307 | 0.94 (0.92–0.97) | <0.001 | | 300 | 0.98 (0.95–1.00) | 0.16 | |

3MSE indicates Modified Mini-Mental State Examination; BMI, body mass index; CES-D, Center for Epidemiologic Studies Depression; CI, confidence interval; CRP, C-reactive protein; HR, hazard ratio; IL, interleukin; and int, interactions.

*Adjusted for time between risk factor assessment and stroke.

†Adjusted for time between risk factor assessment and stroke, ischemic stroke subtype, stroke location, race, sex, education attainment, smoking status, alcohol consumption, living alone status, atrial fibrillation, coronary heart disease, congestive heart failure, diabetes mellitus, depression (CES-D>12), low cognitive function (3MSE<80), BMI, anticoagulant use, and antihypertensive medication use.

‡n in each analysis.

§*P* value for interactions.

‖Per doubling in concentration.

#Per 10 mm Hg.

¶Per 10 mg/dL.

# FRAGILITE et AVC

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Cardiovascular Health Study
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717 patients with Stroke
Fried model

**Table 5. Associations of Frailty Components With Survival Time, Cognitive Decline, and Increased Activities of Daily Living Limitations After Ischemic Stroke**

| | Unadjusted Hazard of Death After Stroke | | | | Adjusted Hazard of Death After Stroke | | | |
|---|---|---|---|---|---|---|---|---|
| | n‡ | HR* (95% CI) | *P* Value | Int.§ | n‡ | HR† (95% CI) | *P* Value | Int.§ |
| Slow walking speed | 623 | 1.57 (1.33–1.86) | <0.001 | | 610 | 1.47 (1.22–1.77) | <0.001 | |
| Low grip strength | 587 | 1.53 (1.27–1.84) | <0.001 | | 580 | 1.33 (1.09–1.63) | 0.006 | |
| Low physical activity | 329 | <80 y: 1.58 (1.23–2.03) | <0.001 | 0.04 | 319 | <80 y: 1.65 (1.26–2.15) | <0.001 | 0.009 |
| | 272 | ≥80 y: 1.09 (0.86–1.39) | 0.48 | | 257 | ≥80 y: 1.00 (0.77–1.31) | 0.98 | |
| Exhaustion | 651 | 1.03 (0.86–1.23) | 0.74 | | 626 | 1.11 (0.89–1.39) | 0.34 | |
| Unintentional weight loss | 662 | 1.35 (1.03–1.77) | 0.03 | | 635 | 1.32 (0.99–1.75) | 0.06 | |
| | Unadjusted odds of cognitive decline after stroke | | | | Adjusted odds of cognitive decline after stroke | | | |
| | n‡ | OR* (95% CI) | *P* Value | Int.§ | n‡ | OR† (95% CI) | *P* Value | Int.§ |
| Slow walking speed | 348 | 2.57 (1.65–4.00) | <0.001 | | 341 | 2.00 (1.18–3.39) | 0.01 | |
| Low grip strength | 329 | 2.20 (1.35–3.56) | 0.001 | | 327 | 1.86 (1.05–3.32) | 0.03 | |
| Low physical activity | 329 | 1.75 (1.10–2.78) | 0.02 | | 321 | 1.52 (0.85–2.70) | 0.16 | |
| Exhaustion | 357 | 1.19 (0.76–1.85) | 0.45 | | 347 | 1.24 (0.68–2.27) | 0.49 | |
| Unintentional weight loss | 346 | 1.64 (0.75–3.59) | 0.22 | | 337 | 1.25 (0.50–3.16) | 0.63 | |
| | Unadjusted odds of increased ADL limitations | | | | Adjusted odds of increased ADL limitations | | | |
| | n‡ | OR* (95% CI) | *P* Value | Int.§ | n‡ | OR† (95% CI) | *P* Value | Int.§ |
| Slow walking speed | 394 | 2.70 (1.78–4.10) | <0.001 | | 384 | 2.19 (1.33–3.62) | 0.002 | |
| Low grip strength | 371 | 2.30 (1.45–3.64) | <0.001 | | 366 | 1.74 (1.01–3.02) | 0.05 | |
| Low physical activity | 167 | Males: 1.21 (0.60–2.45) | 0.59 | 0.04 | 160 | Males: 1.05 (0.44–2.50) | 0.91 | 0.14 |
| | 197 | Females: 3.24 (1.77–5.91) | <0.001 | | 189 | Females: 2.42 (1.21–4.86) | 0.01 | |
| Exhaustion | 407 | 1.66 (1.08–2.55) | 0.02 | | 391 | 1.82 (1.02–3.24) | 0.04 | |
| Unintentional weight loss | 411 | 1.49 (0.72–3.06) | 0.28 | | 397 | 1.20 (0.52–2.76) | 0.67 | |

3MSE indicates Modified Mini-Mental State Examination; BMI, body mass index; CES-D, Center for Epidemiologic Studies Depression; CI, confidence interval; CRP, C-reactive protein; HR, hazard ratio; IL, interleukin; and int., interactions.

*Adjusted for time between risk factor assessment and stroke.

†Adjusted for time between risk factor assessment and stroke, ischemic stroke subtype, stroke location, race, sex, education attainment, smoking status, alcohol consumption, living alone status, atrial fibrillation, coronary heart disease, congestive heart failure, diabetes mellitus, depression (CES-D>12), low cognitive function (3MSE<80), BMI, anticoagulant use, and anti-hypertensive medication use.

‡n in each analysis.

§*P* value for interactions.

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*Winowich, Stroke 2017*

# FRAGILILTE

Japan 2017-2019
234 patients - 75.7 years old - 36% women
Stroke within 48 hours, ≥ 65, Rankin < 4
Frailty assessment : FSI

**Pre-Stroke Frailty and Stroke Severity in Elderly Patients with Acute Stroke**

Masashi Kanai,[‡§#] Madoka Noguchi,[†] Hiroki Kubo,[†] Masafumi Nozoe,[*] Tamami Kitano,[†‡#] Kazuhiro P. Izawa,[§#] Kyoshi Mase,[*] and Shinichi Shimada,[§¶#]

**Table 2.** *Multivariate regression analysis for predicting stroke severity.*

| | β | *P* value |
|---|---|---|
| Presence of frailty | | |
| Robust | Reference | |
| Pre-frailty | 1.191 | .005 |
| Frailty | 1.708 | .009 |
| Hypertension | .144 | .709 |
| Diabetes mellitus | .798 | .084 |
| Dyslipidemia | - .441 | .386 |
| Previous stroke | .661 | .115 |
| Ischemic heart disease | - .551 | .458 |
| Atrial fibrillation | .366 | .650 |
| Smoking history | - .413 | .390 |
| | Adjusted $R^2$ = .151 | |

Adjusted by confounding factors of age, sex body mass index, stroke type, affected side, and premorbid modified Rankin Scale.

Multiple linear regression analysis showed that prestroke
pre-frailty and frailty were significantly associated with NIHSS score (prefrailty : β= 1.191, P = .005; frailty : β = 1.708, P = .009).

*Kanai M et al., J Stroke Cerebrovasc Dis 2020*

Comment veut-il que je teste la vitesse de marche chez un patient hémiplégique ?

# FRAGILITE : ROCKWOOD

**1 Très en forme -** Personnes qui sont robustes, actives, énergiques et motivées. Ces personnes font de l'exercice régulièrement. Ils sont parmi les plus en forme de leur âge.

**2 Bien** - Personnes qui ne présentent **aucun symptôme de maladie active** mais sont moins en forme que la catégorie 1. Font souvent, des exercices ou sont très **actives par période**. (par exemple des variations saisonnières).

**3 Assez bien** - Personnes dont les **problèmes médicaux sont bien contrôlés**, mais ne sont **pas régulièrement actives** au-delà de la marche quotidienne.

**4 Vulnérable - Sans être dépendantes** des autres pour l'aide quotidienne, souvent leurs **symptômes limitent leurs activités**. Une plainte fréquente est d'être ralentie et/ou d'être fatiguée pendant la journée.

**5 Légèrement fragile -** Personnes qui ont souvent **un ralentissement plus évident**, et ont besoin d'aide dans les **activités d'ordre élevé de la vie quotidienne** (finances, transport, grosses tâches ménagères, médicaments). Généralement, la fragilité légère empêche progressivement de faire les courses, de marcher seul dehors, de préparer les repas et de faire le ménage.

**6 Modérément fragile -** Personnes qui ont besoin d'aide pour **toutes les activités à l'extérieur** et pour l'**entretien de la maison**. A l'intérieur, elles ont souvent des problèmes pour monter/descendre les escaliers, ont besoin d'aide **pour prendre un bain** et pourraient avoir besoin d'une aide minimale (être à coté) pour s'habiller.

**7 Sévèrement fragile - Totalement dépendantes pour les soins personnels,** quelle que soit la cause (physique ou cognitive). Malgré tout, elles semblent stables et n'ont pas un risque élevé de décéder (dans les prochains 6 mois).

**8 Très sévèrement fragile -** Totalement dépendantes, la fin de vie approche. Typiquement, elles ne pourraient pas récupérer même d'une maladie mineure/ maladie légère.

**9 En phase terminale -** Approchant la fin de vie. Cette catégorie concerne les personnes ayant une **espérance de vie < 6 mois**, qui **sinon ne sont pas fragiles de façon évidente.**

**Classification de la fragilité des personnes atteintes de démence.**

Le degré de fragilité correspond au degré de démence.

Les **symptômes courants de démence légère** inclus : l'oubli des détails d'un événement récent mais le souvenir que l'événement a eu lieu, la répétition de la même question / histoire et le retrait social.

Dans la **démence modérée**, la mémoire récente est très altérée, même si les personnes peuvent bien se rappeler des événements de leur vie passée. Ils peuvent faire des soins personnels avec incitation.

Dans la **démence grave**, elles ne peuvent pas faire les soins personnels sans aide.

FRAGILITE > 4

**Fig. 2** Clinical Frailty Scale, French translated final version (CFS-FR). Permission to use the CSF was granted from Dalhousie University, Ca. May 15. 2017

*Abraham P et al, BMC Ger 2019*

# FRAGILITE et AVC

Cambridge UK
2013 → 2016
433 patients
Ischemic stroke, ≥ 75 years old
Clinical Frailty Scale Rockwood

RESEARCH PAPER

**Clinical frailty independently predicts early mortality after ischaemic stroke**

Nicholas R. Evans[1,2], Jasmine Wall[3], Benjaman To[1], Stephen J. Wallis[3], Roman Romero-Ortuno[3], Elizabeth A. Warburton[1]

**Table 1**. Clinical characteristics for all ischaemic strokes.

| | Non-frail (CFS 1–4) | Frail (CFS 5–8) | Significance |
|---|---|---|---|
| Number | 199 | 234 | |
| Median baseline NIHSS (IQR) | 3 (1–7) | 4.5 (1–12) | $P = 0.14$ |
| Median age (IQR) | 83 (77–86) | 87 (83–92) | $P < 0.01$ |
| Male sex | 103 (51.8%) | 87 (37.2%) | $P < 0.01$ |
| Hypertension | 129 (64.8%) | 152 (65.0%) | $P = 0.98$ |
| Diabetes mellitus | 40 (20.1%) | 48 (20.5%) | $P = 0.92$ |
| Ischaemic heart disease | 44 (22.1%) | 50 (21.4%) | $P = 0.54$ |
| Atrial fibrillation | 92 (46.2%) | 119 (50.9%) | $P = 0.34$ |
| Thrombolysed | 36 (18.1%) | 27 (11.5%) | $P = 0.05$ |
| 28-day mortality | 10 (5.0%) | 39 (16.7%) | $P < 0.01$ |

**Table 2**. Logistic regression for 28-day mortality for all ischaemic strokes.

| | Odds ratio (95% CI) | Significance |
|---|---|---|
| CFS | 1.03 (1.01–1.05) | $P < 0.01$ |
| Baseline NIHSS | 1.01 (1.001–1.02) | $P = 0.03$ |
| Thrombolysis | 0.82 (0.70–0.95) | $P = 0.01$ |
| Age | 1.00 (0.99–1.01) | $P = 0.26$ |
| Male sex | 0.72 (0.28–1.87) | $P = 0.50$ |
| Hypertension | 0.94 (0.88–1.01) | $P = 0.11$ |
| Diabetes mellitus | 1.04 (0.95–1.13) | $P = 0.43$ |
| Atrial fibrillation | 1.07 (0.97–1.17) | $P = 0.18$ |

**Table 3**. Linear regression model for interval NIHSS change (Intercept −10.03) in the thrombolysed subgroup. The intercept represents a 10.03 point improvement in NIHSS following thrombolysis, with positive coefficients representing attenuated NIHSS improvement and negative coefficients larger NIHSS improvement.

| Interval NIHSS change | Coefficient | Significance |
|---|---|---|
| CFS | 1.07 | $P = 0.03$ |
| Diabetes mellitus | 4.65 | $P = 0.04$ |
| Age | 0.03 | $P = 0.82$ |
| Male sex | 0.23 | $P = 0.88$ |
| Hypertension | 0.26 | $P = 0.87$ |
| Atrial fibrillation | −0.24 | $P = 0.88$ |
| Baseline NIHSS | −0.06 | $P = 0.63$ |

*Evans N. et al, Age Ageing 2020*

# FRAGILITE et AVC

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433 patients
Ischemic stroke, ≥ 75 years old
Clinical Frailty Scale Rockwood

RESEARCH PAPER

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| Male sex | 103 (51.8%) | [illegible] | $P < 0.01$ |
| Hypertension | 129 (64.8%) | [illegible] | $P = 0.98$ |
| Diabetes mellitus | [illegible] | [illegible] | $P = 0.92$ |
| Ischaemic heart disease | [illegible] | [illegible] | $P = 0.54$ |
| Atrial fibrillation | [illegible] | 119 (50.9%) | $P = 0.34$ |
| Thrombolysis | [illegible] | 27 (11.5%) | $P = 0.05$ |
| 28-day mortality | 10 (5.0%) | 39 (16.7%) | $P < 0.01$ |

FRAILTY INCREASES 28 DAYS MORTALITY

**Table 2**. Logistic regression for 28-day mortality for all ischaemic strokes.

| | Odds ratio (95% CI) | Significance |
|---|---|---|
| CFS | 1.03 (1.01–1.05) | $P < 0.01$ |
| Baseline NIHSS | 1.01 (1.001–1.02) | $P = 0.03$ |
| Thrombolysis | 0.82 (0.70–0.95) | $P = 0.01$ |
| Age | 1.00 (0.99–1.01) | $P = 0.26$ |
| Male sex | 0.72 (0.28–1.87) | $P = 0.50$ |
| Hypertension | 0.94 (0.88–1.01) | $P = 0.11$ |
| Diabetes mellitus | 1.04 (0.95–1.13) | $P = 0.43$ |
| Atrial fibrillation | 1.07 (0.97–1.17) | $P = 0.18$ |

**Table 3**. Linear regression model for interval NIHSS change (Intercept −10.03) in the thrombolysed subgroup. The intercept represents a 10.03 point improvement in NIHSS following thrombolysis with negative coefficients [illegible] interval NIHSS change

| | Coefficient | Significance |
|---|---|---|
| CFS | 1.07 | $P = 0.03$ |
| Diabetes mellitus | 4.65 | $P = 0.04$ |
| Age | 0.03 | $P = 0.82$ |
| Male sex | 0.23 | $P = 0.88$ |
| Hypertension | 0.26 | $P = 0.87$ |
| Atrial fibrillation | −0.24 | $P = 0.88$ |
| Baseline NIHSS | −0.06 | $P = 0.63$ |

FRAILTY ATTENUATES THE NIHSS IMPROVEMENT AFTER THROMBOLYSIS

*Evans N. et al, Age Ageing 2020*


I HAVE THIS TERRIBLE FEELING OF
DEJA VU
ngflip.com

# Echelle de Rankin modifiée (mRs)

## pour estimer handicap avant et après AVC

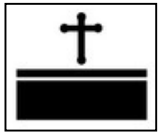
No handicap (Rankin 0-1)

Minor handicap (Rankin 2)

Moderate handicap (Rankin 3-4)

Bedridden (Rankin 5)

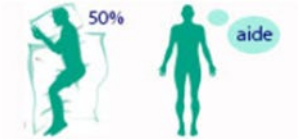
Death (Rankin score 6)



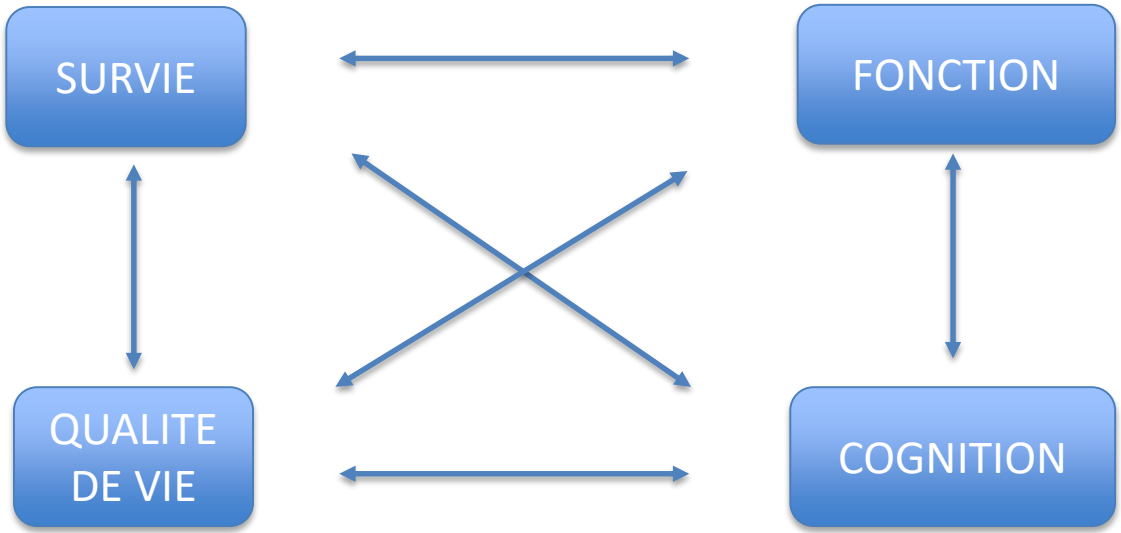


Rankin Scott Med J 1957

# Performance Status OMS

| | | |
|---|---|---|
| 0 |  | Capable d'une activité identique à celle précédant la maladie sans aucune restriction. |
| 1 |  | Activité physique diminuée mais ambulatoire et capable de mener un travail. |
| 2 |  | Ambulatoire et capable de prendre soin de soi-même, incapable de travailler. Alité moins de 50 % de son temps. |
| 3 |  | Capable seulement de quelques soins. Alité ou en chaise plus de 50 % du temps. |
| 4 |  | Incapable de prendre soin de soi-même. Alité ou en chaise en permanence. |

# DECISION THERAPEUTIQUE



# PLAN

1. PATIENTS ÂGÉS
2. MULTIMORBIDITÉ
3. FRAGILITÉ
4. ÉTAT CONFUSIONNEL

# DELIRIUM : DEFINITIONS

**Table 1 A comparison of DSM-IV and DSM-5 criteria for delirium**

| DSM-5 | DSM-IV |
|---|---|
| A. A disturbance in attention (i.e., reduced ability to direct, focus, sustain, and shift attention) and awareness (reduced orientation to the environment). | A. Disturbance of consciousness (i.e., reduced clarity of awareness of the environment) with reduced ability to focus, sustain or shift attention. |
| B. The disturbance develops over a short period of time (usually hours to a few days), represents a change from baseline attention and awareness, and tends to fluctuate in severity during the course of a day. | C. The disturbance develops over a short period of time (usually hours to days) and tends to fluctuate during the course of the day |
| C. An additional disturbance in cognition (e.g. memory deficit, disorientation, language, visuospatial ability, or perception). | B. A change in cognition or the development of a perceptual disturbance that is not better accounted for by a pre-existing, established or evolving dementia. |
| D. The disturbances in Criteria A and C are not better explained by a pre-existing, established or evolving neurocognitive disorder and do not occur in the context of a severely reduced level of arousal, such as coma. | |
| E. There is evidence from the history, physical examination or laboratory findings that the disturbance is a direct physiological consequence of another medical condition, substance intoxication or withdrawal, or exposure to a toxin, or is due to multiple etiologies. | D. There is evidence from the history, physical examination or laboratory findings that the disturbance is caused by the direct physiological consequences of a general medical condition. |

ATTENTION
AIGU/FLUCTUANT
COGNITION
CONSCIENCE

# DELIRIUM : DEPISTAGE AVEC CONFUSION ASSESSMENT METHOD

1. Début AIGU et fluctuation des symptômes: hétéroanamnèse
2. Troubles de l'ATTENTION: compter 20 -> 0, mois de l'année à l'envers, épeler « monde » à l'envers
3. DÉSORGANISATION de la pensée: pensée incohérente, conversation décousue, suite illogique des idées, coq-à-l'âne
4. Altération de l'état de CONSCIENCE: alerte, vigilant, léthargique, stuporeux, comateux

**(1 ET 2) + 3 ET/OU 4**

Sensibilité 94%
Spécificité 89%

*Inouye S, Annals of Internal Medicine, 1990*
*Inouye S, Lancet 2014*

# DELIRIUM : INCIDENCE

**Delirium in elderly people**

*Sharon K Inouye, Rudi G J Westendorp, Jane S Saczynski*

| | Prevalence (%)* | Incidence (%)* | Outcomes (adjusted RR†) |
|---|---|---|---|
| Surgical | | | |
| Cardiac | .. | 11–46 | Cognitive dysfunction 1·7; functional decline 1·9 |
| Non-cardiac | .. | 13–50 | Functional decline 2·1; cognitive dysfunction 1·6 |
| Orthopaedic | 17 | 12–51 | Dementia or cognitive dysfunction 6·4–41·2; admission to institution 5·6 |
| Medical | | | |
| General medical | 18–35 | 11–14 | Mortality 1·5–1·6; functional decline 1·5 |
| Old age medicine | 25 | 20–29 | Falls 1·3; mortality 1·9; admission to institution 2·5 |
| Intensive care | 7–50 | 19–82 | Mortality 1·4–13·0; longer length of stay 1·4–2·1; extended mechanical ventilation 8·6 |
| Stroke | .. | 10–27 | Mortality 2·0; any of increased length of stay, functional impairment, or death 2·1 |
| Dementia | 18 | 56 | Cognitive decline 1·6–3·1; admission to an institution 9·3; mortality 5·4 |
| Palliative care, cancer | .. | 47 | .. |
| Nursing home or postacute care | 14 | 20–22 | Mortality 4·9 |
| Emergency department | 8–17 | .. | Mortality 1·7 |

Some data are provided as ranges. All values were derived from selected articles with sample sizes of 100 or more that satisfied the Strengthening the Reporting of OBservational studies in Epidemiology (STROBE) criteria for setting, participants, measurement, and statistical methods, and included a validated delirium instrument. An additional inclusion criterion for incidence studies was serial delirium assessments no more than 3 days apart by trained research staff or clinicians. The appendix contains a complete list of references and further details on all articles. RR=relative risk. *Sum of prevalence and incidence yields overall occurrence rates of delirium in each setting. †Derived from studies that provided adjustment for at least one covariable.

***Table 1:*** **Incidence of delirium and associated outcomes, by population**

*Inouye S. et al, Lancet 2014*

# DELIRIUM : FACTEURS PREDISPOSANTS ET PRECIPITANTS

**Delirium in elderly people**

*Sharon K Inouye, Rudi G J Westendorp, Jane S Saczynski*

| | General medicine | Surgery | | Intensive-care unit |
|---|---|---|---|---|
| | | Non-cardiac | Cardiac | |
| **Predisposing factors** | | | | |
| Dementia | 2·3–4·7 | 2·8 | .. | .. |
| Cognitive impairment | 2·1–2·8 | 3·5–4·2 | 1·3 | .. |
| History of delirium | .. | 3·0 | .. | .. |
| Functional impairment | 4·0 | 2·5–3·5 | .. | .. |
| Visual impairment | 2·1–3·5 | 1·1–3·0 | .. | .. |
| Hearing impairment | .. | 1·3 | .. | .. |
| Comorbidity or severity of illness | 1·3–5·6 | 4·3 | .. | 1·1 |
| Depression | 3·2 | .. | 1·2 | .. |
| History of transient ischaemia or stroke | .. | .. | 1·6 | .. |
| Alcohol misuse | 5·7 | 1·4–3·3 | .. | .. |
| Older age (≥75 years) | 4·0 | 3·3–6·6 | .. | 1·1 |

Data are relative risks. Some data are reported as ranges. The appendix contains a complete list of references.
BUN=blood urea nitrogen.

| | General medicine | Surgery | | Intensive-care unit |
|---|---|---|---|---|
| | | Non-cardiac | Cardiac | |
| **Precipitating factors** | | | | |
| Drugs | | | | |
| Several drugs used | 2·9 | .. | .. | .. |
| Psychoactive drugs | 4·5 | .. | .. | .. |
| Sedatives or hypnotics | .. | .. | .. | 4·5 |
| Use of physical restraints | 3·2–4·4 | .. | .. | .. |
| Use of bladder catheter | 2·4 | .. | .. | .. |
| Physiological | | | | |
| Increased serum urea | 5·1 | .. | .. | 1·1 |
| Increased BUN:creatinine ratio | 2·0 | 2·9 | .. | .. |
| Abnormal serum albumin | .. | .. | 1·4 | .. |
| Abnormal sodium, glucose, or potassium | .. | 3·4 | .. | .. |
| Metabolic acidosis | .. | .. | .. | 1·4 |
| Infection | .. | .. | .. | 3·1 |
| Any iatrogenic event | 1·9 | .. | .. | .. |
| Surgery | | | | |
| Aortic aneurysm | .. | 8·3 | .. | .. |
| Non-cardiac thoracic | .. | 3·5 | .. | .. |
| Neurosurgery | .. | .. | .. | 4·5 |
| Trauma admission | .. | .. | .. | 3·4 |
| Urgent admission | .. | .. | .. | 1·5 |
| Coma | .. | .. | .. | 1·8–21·3 |

Data are relative risks. Some data are reported as ranges. The appendix contains a complete list of references.
BUN=blood urea nitrogen.

*Inouye S. et al, Lancet 2014*

# DELIRIUM et AVC

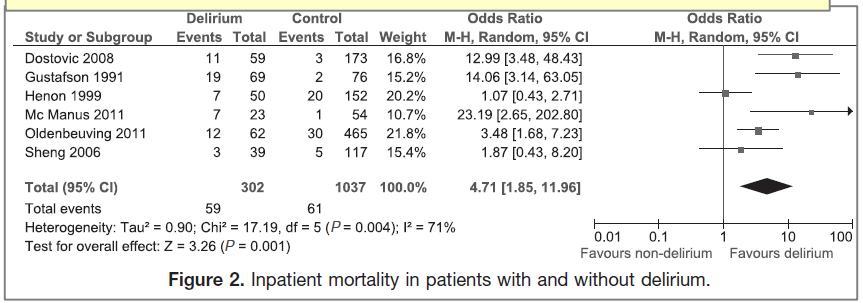
Systematic review and meta-analysis
10 studies, 2004 patients
Delirium in acute phase stroke

**Delirium in Acute Stroke**
**A Systematic Review and Meta-Analysis**

Qiyun Shi, MD, MSc; Roseanna Presutti, BSc(C);
Daniel Selchen, MD, FRCPC; Gustavo Saposnik, MD, MSc, FAHA, FRCPC

## INCIDENCE OF DELIRIUM : 10 – 48%

### ↑ INPATIENT MORTALITY (OR 4.71; 95%CI 1.85-11.96)



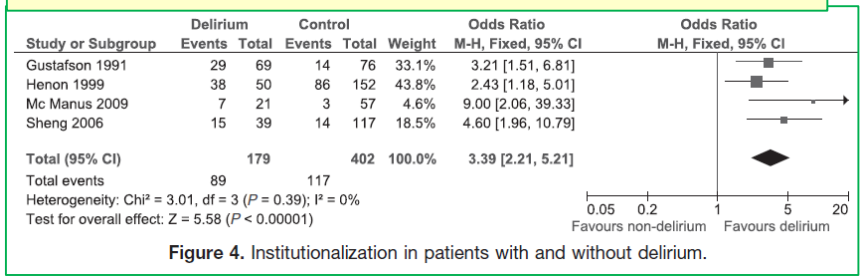
| Study or Subgroup | Delirium Events | Delirium Total | Control Events | Control Total | Weight | Odds Ratio M-H, Random, 95% CI |
|---|---|---|---|---|---|---|
| Dostovic 2008 | 11 | 59 | 3 | 173 | 16.8% | 12.99 [3.48, 48.43] |
| Gustafson 1991 | 19 | 69 | 2 | 76 | 15.2% | 14.06 [3.14, 63.05] |
| Henon 1999 | 7 | 50 | 20 | 152 | 20.2% | 1.07 [0.43, 2.71] |
| Mc Manus 2011 | 7 | 23 | 1 | 54 | 10.7% | 23.19 [2.65, 202.80] |
| Oldenbeuving 2011 | 12 | 62 | 30 | 465 | 21.8% | 3.48 [1.68, 7.23] |
| Sheng 2006 | 3 | 39 | 5 | 117 | 15.4% | 1.87 [0.43, 8.20] |
| **Total (95% CI)** | | **302** | | **1037** | **100.0%** | **4.71 [1.85, 11.96]** |
| Total events | 59 | | 61 | | | |

Heterogeneity: Tau² = 0.90; Chi² = 17.19, df = 5 (*P* = 0.004); I² = 71%
Test for overall effect: Z = 3.26 (*P* = 0.001)



**Figure 2.** Inpatient mortality in patients with and without delirium.

### ↑ INSTITUTIONALIZATION (OR 3.39; 95%CI 2.21-5.21)



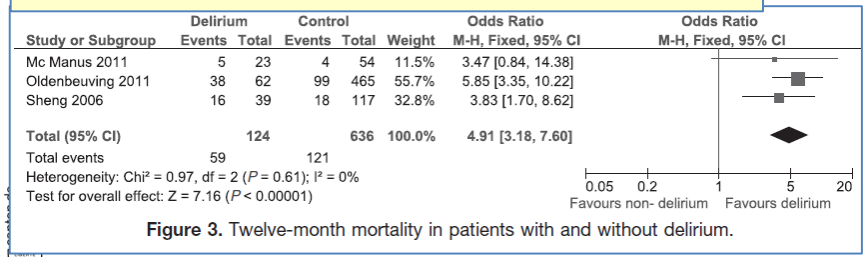
| Study or Subgroup | Delirium Events | Delirium Total | Control Events | Control Total | Weight | Odds Ratio M-H, Fixed, 95% CI |
|---|---|---|---|---|---|---|
| Gustafson 1991 | 29 | 69 | 14 | 76 | 33.1% | 3.21 [1.51, 6.81] |
| Henon 1999 | 38 | 50 | 86 | 152 | 43.8% | 2.43 [1.18, 5.01] |
| Mc Manus 2009 | 7 | 21 | 3 | 57 | 4.6% | 9.00 [2.06, 39.33] |
| Sheng 2006 | 15 | 39 | 14 | 117 | 18.5% | 4.60 [1.96, 10.79] |
| **Total (95% CI)** | | **179** | | **402** | **100.0%** | **3.39 [2.21, 5.21]** |
| Total events | 89 | | 117 | | | |

Heterogeneity: Chi² = 3.01, df = 3 (*P* = 0.39); I² = 0%
Test for overall effect: Z = 5.58 (*P* < 0.00001)



**Figure 4.** Institutionalization in patients with and without delirium.

### ↑ 12 MO MORTALITY (OR 4.91; 95%CI 3.18-7.60)



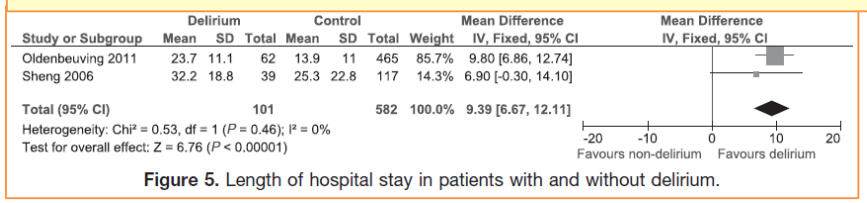
| Study or Subgroup | Delirium Events | Delirium Total | Control Events | Control Total | Weight | Odds Ratio M-H, Fixed, 95% CI |
|---|---|---|---|---|---|---|
| Mc Manus 2011 | 5 | 23 | 4 | 54 | 11.5% | 3.47 [0.84, 14.38] |
| Oldenbeuving 2011 | 38 | 62 | 99 | 465 | 55.7% | 5.85 [3.35, 10.22] |
| Sheng 2006 | 16 | 39 | 18 | 117 | 32.8% | 3.83 [1.70, 8.62] |
| **Total (95% CI)** | | **124** | | **636** | **100.0%** | **4.91 [3.18, 7.60]** |
| Total events | 59 | | 121 | | | |

Heterogeneity: Chi² = 0.97, df = 2 (*P* = 0.61); I² = 0%
Test for overall effect: Z = 7.16 (*P* < 0.00001)



**Figure 3.** Twelve-month mortality in patients with and without delirium.

### ↑ LENGTH OF HOSPITAL STAY (OR 9.39; 95%CI 6.67-12.11)



| Study or Subgroup | Delirium Mean | Delirium SD | Delirium Total | Control Mean | Control SD | Control Total | Weight | Mean Difference IV, Fixed, 95% CI |
|---|---|---|---|---|---|---|---|---|
| Oldenbeuving 2011 | 23.7 | 11.1 | 62 | 13.9 | 11 | 465 | 85.7% | 9.80 [6.86, 12.74] |
| Sheng 2006 | 32.2 | 18.8 | 39 | 25.3 | 22.8 | 117 | 14.3% | 6.90 [-0.30, 14.10] |
| **Total (95% CI)** | | | **101** | | | **582** | **100.0%** | **9.39 [6.67, 12.11]** |

Heterogeneity: Chi² = 0.53, df = 1 (*P* = 0.46); I² = 0%
Test for overall effect: Z = 6.76 (*P* < 0.00001)



**Figure 5.** Length of hospital stay in patients with and without delirium.

*Shi Q et al., Stroke 2012*

# DELIRIUM et AVC

Sidney, 2002-2003
Cohort study, 12 months
168 patients ≥ 65 years old, stroke
Deliriume assessment : DSM IV

**Delirium within Three Days of Stroke in a Cohort of Elderly Patients**

*Ai Zhen Sheng, MD,*† Qing Shen, MD,*‡ Dennis Cordato, PhD,† Yun Yun Zhang, PhD,* and Daniel Kam Yin Chan, MD*‖*

INCIDENCE OF DELIRIUM : 25%

**RESULTS:** Thirty-nine (25%) elderly stroke patients had delirium within 3 days after stroke. Logistic regression analysis found that older age ($P = .04$), hemorrhagic stroke ($P = .02$), metabolic disorders ($P = .003$), dementia pre-stroke ($P = .02$), Glasgow Coma Scale (GCS) score less than 15 on admission ($P < .001$), and inability to lift both arms on admission ($P = .03$) were independent predisposing factors for delirium. Patients who had a cardioembolic stroke (odds ratio (OR) = 5.58) or total anterior circulation infarction (OR = 3.42) were also more likely to develop delirium. Patients with delirium were associated with higher 6- and 12-month mortality ($P < .05$), lower 12-month FIM and MMSE scores, and a higher 12-month institutionalization rate.

*Sheng A et al., JAGS 2006*

# DELIRIUM et AVC

Poland, district general hospital
2nd restrospective analysis of DELIAS Study
760 patients, >18 years old

Clinical Interventions in Aging
Dovepress
ORIGINAL RESEARCH

Characteristics, Risk Factors And Outcome Of Early-Onset Delirium In Elderly Patients With First Ever Acute Ischemic Stroke - A Prospective Observational Cohort Study

**INCIDENCE OF DELIRIUM : 15.9%**

**Table 1** Baseline Demographic Data And Co-Morbidities Of Patients With And Without Delirium

| Variables | Delirium (n = 121) | No Delirium (n = 639) | p-value |
|---|---|---|---|
| **Demographic data** | | | |
| Age [years], mean ± SD | 75.95 ± 13.49 | 70.82 ± 12.15 | <0.001 |

**Table 3** Baseline Neurology Data For AIS Patients With And Without Delirium

| Variables | Delirium (n = 121) | No Delirium (n = 639) | p-value |
|---|---|---|---|
| Rankin score at admission, mean ± SD | 4.25 ± 1.21 | 2.74 ± 1.56 | <0.001 |
| NIHSS on admission, mean ± SD | 16.40 ± 7.19 | 9.67 ± 7.46 | <0.001 |
| Hemianopia, n (%) | 86 (71.07) | 186 (29.11) | <0.001 |
| Dysphasia, n (%) | 74 (61.16) | 313 (48.98) | 0.014 |
| Brainstem stroke, n (%) | 5 (4.13) | 34 (5.32) | 0.749 |
| Secondary hemorrhage, n (%) | 6 (4.96) | 19 (2.97) | 0.398 |

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*Koftis K et al., Clin Interv Ageing 2019*

CHUV

# DELIRIUM et AVC

Poland, district general hospital
2nd restrospective analysis of DELIAS Study
760 patients, >18 years old

Clinical Interventions in Aging
Dovepress
ORIGINAL RESEARCH

Characteristics, Risk Factors And Outcome Of Early-Onset Delirium In Elderly Patients With First Ever Acute Ischemic Stroke - A Prospective Observational Cohort Study

**Table 6** Outcome Data For Patients With And Without Delirium

| Variables | | Delirium (n = 121) | No Delirium (n = 639) | p-value |
|---|---|---|---|---|
| Hospitalization time (days), mean ± SD | | 12.12 ± 7.50 | 10.32 ± 6.76 | <0.001 |
| NIHSS at discharge, mean ± SD | | 17.27 ± 14.25 | 8.87 ± 12.14 | <0.001 |
| Rankin score at discharge, mean ± SD | | 3.95 ± 1.85 | 2.20 ± 2.22 | <0.001 |
| Mortality until day 7, n (%) | | 16 (13.22) | 36 (5.63) | 0.005 |
| Mortality until day 30, n (%) | | 41 (33.88) | 82 (12.83) | <0.001 |
| Mortality until day 90, n (%) | | 57 (47.11) | 118 (18.47) | <0.001 |
| Mortality until year 1, n (%) | | 69 (57.02) | 151 (23.63) | <0.001 |
| Outcome | In-hospital death, n (%) | 24 (19.83) | 56 (8.76) | <0.001 |
| | Discharged home, n (%) | 48 (39.67) | 400 (62.60) | |
| | Nursing home, n (%) | 19 (15.70) | 42 (6.57) | |
| | Rehabilitation facility, n (%) | 27 (22.31) | 131 (20.50) | |
| | Other ward, n (%) | 3 (2.48) | 10 (1.56) | |

**Abbreviations:** n, number of patients; SD, standard deviation; NIHSS, National Institutes of Health Stroke Scale.



*Koftis K et al., Clin Interv Ageing 2019*

# DELIRIUM

Cochrane Library
Cochrane Database of Systematic Reviews

**Interventions for preventing delirium in hospitalised non-ICU patients (Review)**

Siddiqi N, Harrison JK, Clegg A, Teale EA, Young J, Taylor J, Simpkins SA

## Authors' conclusions

There is strong evidence supporting multi-component interventions to prevent delirium in hospitalised patients. There is no clear evidence that cholinesterase inhibitors, antipsychotic medication or melatonin reduce the incidence of delirium. Using the Bispectral Index to monitor and control depth of anaesthesia reduces the incidence of postoperative delirium. The role of drugs and other anaesthetic techniques to prevent delirium remains uncertain.

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*Siddiqi N et al. Cochrane 2016*

# DELIRIUM : PREVENTION

The New England Journal of Medicine

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VOLUME 340 MARCH 4, 1999 NUMBER 9

## A MULTICOMPONENT INTERVENTION TO PREVENT DELIRIUM IN HOSPITALIZED OLDER PATIENTS

SHARON K. INOUYE, M.D., M.P.H., SIDNEY T. BOGARDUS, JR., M.D., PETER A. CHARPENTIER, M.P.H., LINDA LEO-SUMMERS, M.P.H., DENISE ACAMPORA, M.P.H., THEODORE R. HOLFORD, PH.D., AND LEO M. COONEY, JR., M.D.

Yale 1995-1998
852 patients >70 years old
Intervention (426 pat) vs usual care (426 pat)

**TABLE 1.** RISK FACTORS FOR DELIRIUM AND INTERVENTION PROTOCOLS.

| TARGETED RISK FACTOR AND ELIGIBLE PATIENTS | STANDARDIZED INTERVENTION PROTOCOLS | TARGETED OUTCOME FOR REASSESSMENT |
|---|---|---|
| Cognitive impairment*<br>All patients, protocol once daily; patients with base-line MMSE score of <20 or orientation score of <8, protocol three times daily | Orientation protocol: board with names of care-team members and day's schedule; communication to reorient to surroundings<br>Therapeutic-activities protocol: cognitively stimulating activities three times daily (e.g., discussion of current events, structured reminiscence, or word games) | Change in orientation score |
| Sleep deprivation<br>All patients; need for protocol assessed once daily | Nonpharmacologic sleep protocol: at bedtime, warm drink (milk or herbal tea), relaxation tapes or music, and back massage<br>Sleep-enhancement protocol: unit-wide noise-reduction strategies (e.g., silent pill crushers, vibrating beepers, and quiet hallways) and schedule adjustments to allow sleep (e.g., rescheduling of medications and procedures) | Change in rate of use of sedative drug for sleep† |
| Immobility<br>All patients; ambulation whenever possible, and range-of-motion exercises when patients chronically non-ambulatory, bed or wheel-chair bound, immobilized (e.g., because of an extremity fracture or deep venous thrombosis), or when prescribed bed rest | Early-mobilization protocol: ambulation or active range-of-motion exercises three times daily; minimal use of immobilizing equipment (e.g., bladder catheters or physical restraints) | Change in Activities of Daily Living score |
| Visual impairment<br>Patients with <20/70 visual acuity on binocular near-vision testing | Vision protocol: visual aids (e.g., glasses or magnifying lenses) and adaptive equipment (e.g., large illuminated telephone key-pads, large-print books, and fluorescent tape on call bell), with daily reinforcement of their use | Early correction of vision, ≤48 hr after admission |
| Hearing impairment<br>Patients hearing ≤6 of 12 whispers on Whisper Test | Hearing protocol: portable amplifying devices, earwax disimpaction, and special communication techniques, with daily reinforcement of these adaptations | Change in Whisper Test score |
| Dehydration<br>Patients with ratio of blood urea nitrogen to creatinine≥18, screened for protocol by geriatric nurse-specialist | Dehydration protocol: early recognition of dehydration and volume repletion (i.e., encouragement of oral intake of fluids) | Change in ratio of blood urea nitrogen to creatinine |

*The orientation score consisted of results on the first 10 items on the Mini–Mental State Examination (MMSE).

†Sedative drugs included standard hypnotic agents, benzodiazepines, and antihistamines, used as needed for sleep.

**TABLE 3.** DELIRIUM-RELATED OUTCOMES DURING HOSPITALIZATION, ACCORDING TO STUDY GROUP.*

| OUTCOME | STUDY GROUP | | STATISTICAL ANALYSIS | |
|---|---|---|---|---|
| | INTERVENTION | USUAL CARE | MATCHED | UNMATCHED |
| All matched patients (n=852) | | | | |
| First episode of delirium — no. of patients (%) | 42 (9.9) | 64 (15.0) | OR, 0.60 (95% CI, 0.39–0.92); P=0.02† | OR, 0.61 (95% CI, 0.40–0.93); P=0.02‡ |
| Total days of delirium§ | 105 | 161 | P=0.02¶ | |
| No. of episodes of delirium‖ | 62 | 90 | P=0.03¶ | |
| Patients with delirium (n=106) | | | | |
| Mean ±SD delirium-severity score | 3.85±1.27 | 3.52±1.44 | | P=0.25** |
| Recurrence (two or more episodes) — no. of patients (%) | 13 (31.0) | 17 (26.6) | | P=0.62†† |

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*Inouye S. et al, NEJM 1999*

# DELIRIUM

ER Journal of Psychosomatic Research 62 (2007) 371–383

Review article

## Delirium: Guidelines for general hospitals

Laurent Michaud[a,b], Christophe Büla[c], Alexandre Berney[b], Vincent Camus[d,e], Rachel Voellinger[a,b], Friedrich Stiefel[b], Bernard Burnand[a,*], the Delirium Guidelines Development Group[1]

1/2

Table 3
Recommendations for the prevention of delirium

| General recommendations | Specific recommendations | Grade |
|---|---|---|
| Detect and treat cognitive impairment | Routine screening of cognitive functions and delirium, whenever possible, using standardized instruments (e.g., MMSE or BOMC on admission, and CAM during hospital stay) | A |
| | Cognitively stimulating activities adapted to the patient | C |
| Favor high-quality sleep | Nonpharmacological sleep promotion | A |
| | Noise reduction; use of low-level lighting; avoidance of constant lighting | A |
| | Maintenance of a normal sleep–wake cycle | A |
| Minimize drug side effects | Limitation of the total number of drugs | C |
| | Avoidance or cautious use of the following medications:<br>• Psychotropics, especially hypnosedatives and benzodiazepines<br>• Anticholinergic drugs<br>• Opioids | C |
| Prevent/correct electrolytic disturbances and dehydration | Stimulation of adequate hydration; use of fluid balance charts | A |
| | Biochemical screening; early management of electrolyte disturbances | B |
| | Hypodermoclysis if oral intake is inadequate | C |
| Improve communication and orientation | Regular verbal communication; use of short sentences; frequent information on place, reason for hospitalization, and daily activities; whenever possible, involvement of patient in the process of care; information and reassurance about medical procedures | B |
| | "On-time" clocks and calendars; familiar artifacts, whenever possible (i.e., posters); avoidance of ward or room transfers; continuity of care | B |
| Limit sensory underload or overload | Screening for visual and hearing impairment; provision of visual and hearing aids; adequate lighting; use of nightlights; avoidance of blind rooms (without windows) | A |
| Involve and inform significant others | Information of proxies regarding delirium; encouragement of visits to the patient and involvement in orientation; nursing and feeding; support of proxies | C |

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*Michaud L et al., JourPsychosomRes 2007*

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# DELIRIUM

ER Journal of Psychosomatic Research 62 (2007) 371–383

Review article

## Delirium: Guidelines for general hospitals

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Table 3
Recommendations for the prevention of delirium

| General recommendations | Specific recommendations | Grade |
|---|---|---|
| Avoid malnutrition and vitamin deficiencies | Nutritional support and/or vitamin supplements for high-risk groups (i.e., B vitamins for alcoholic abusers) | B |
| Prevent or treat withdrawal | If middle-aged adults are at high risk for alcohol withdrawal, prevention with benzodiazepines | A |
| | Clomethiazole for prevention of withdrawal in the elderly | B |
| | Systematic screening for alcohol abuse | B |
| Do not use physical restraints | Protocol for physical restraints | A |
| Favor mobilization | Avoidance of immobilization; education regarding hazards of bed rest | A |
| | Limiting the use of catheter and intravenous line; avoidance of the use of Foley catheter | B |
| | Early mobilization protocol; evaluation by physiotherapist, whenever necessary | B |
| | Stimulation of mobility; performance of self-care and daily activities | B |
| Optimize operative conditions | Adequate analgesia; patient-controlled analgesia, if feasible | B |
| | Prevention of postoperative hypotension/hypoxemia | C |
| | Maintenance of postoperative hematocrit level at >30% | C |
| Consider interventions on the system | Staff education | A |
| | Development and implementation of guidelines regarding harmful procedures (i.e., physical restraints, polymedication, unnecessary catheters) | B |
| | Adequate staff allocation | B |
| | Involvement of volunteers and family | C |

# DELIRIUM : PREVENTION

Article

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**The Effects of Delirium Prevention Guidelines on Elderly Stroke Patients**

Content Validity of DPGESP.

| | Detailed intervention plan | CVI |
|---|---|---|
| Risk factor assessment | Assess for risk factors at admission | 0.92 |
| | Check for drugs that the patient has been taking | 0.93 |
| Orientation disorder prevention | Screen using DOS at each shift (8:00 a.m., 4:00 p.m., midnight) | 0.87 |
| | Check for the bedside presence of a large-font clock and calendar | 0.92 |
| | Explain the current time, place, and status every 4 hr | 1.0 |
| | Short conversations in a smooth and unraised voice | 0.98 |
| | Extend the visiting hours of the primary caretaker to 1 hr | 0.89 |
| Maintain sleeping patterns | Encourage the patient to not sleep during the day | 0.89 |
| | Apply eye patches while sleeping at night and reduce noise to a minimum; supply the patient with earplugs when requested | 0.92 |
| Sensory interventions | Encourage the patient to use glasses or hearing aids when necessary | 0.92 |
| | Keep blinds and curtains open near the bed | 0.91 |
| | Provide appropriate night-time lighting | 0.97 |
| Prevent constipation and dehydration | Check input and output every 8 hr (6:00 a.m., 2:00 p.m., 10:00 p.m.); notify the attending surgeon if exceeding ± 500 mL and fix accordingly | 0.82 |
| | Maintain >1 L of hydration per prescription (if no prescription related to fluids, encourage >1 L of water intake) | 0.82 |
| | Examine and record dehydration symptoms (urine color and states of the tongue and skin) every 8 hr (6:00 a.m., 2:0 p.m., 10:00 p.m.) | 0.91 |
| | After checking with the lab, notify the attending doctor if BUN/Cr ratio is >18, or if aberrant sodium or potassium values are observed | 0.89 |
| | Induce urination if no urination has occurred within 6 hr; if no urination after nursing intervention, notify the attending doctor and perform catheterization | 0.89 |
| | If no bowel movement is observed for >3 days, induce bowel movements and notify the attending doctor | 0.91 |

Content Validity of DPGESP.

| | Detailed intervention plan | CVI |
|---|---|---|
| Preventing hypoxia | Provide 24-hr oxygen saturation monitoring | 0.96 |
| | If oxygen saturation falls below 90%, notify the attending doctor and intervene to maintain ≥90% oxygen saturation | 0.98 |
| Infection prevention | Measure body temperature every 4 hr; notify the attending doctor if the patient has a temperature of >38°C | 0.92 |
| | Avoid unnecessary catheterization | 0.92 |
| | Wash hands before and after contacting the patient | 0.92 |
| Pain management | Regularly assess pain levels using the Numeric Rating Scale during each shift (6:00 a.m., 2:00 p.m., 10:00 p.m.) | 0.82 |
| | If the patient has a pain score of >3, notify the attending doctor and provide active pain control | 0.92 |
| Maintain appropriate nutrition | Feed the patients meals with caloric contents that are optimized to the patient's body mass index | 0.92 |
| | Ensure the meals match the patient's swallowing ability, based on their dysphasia screening test results at admission | 0.94 |
| | Supply meals that match the patient's oral health | 0.86 |
| Ambulation | Encourage the patient to do early ambulation | 0.65 |

*Note.* DPGESP = Delirium Prevention Guidelines for Elderly Stroke Patients; CVI = content validity index; DOS = Delirium Observation Screening; BUN/Cr = blood urea nitrogen/creatinine.

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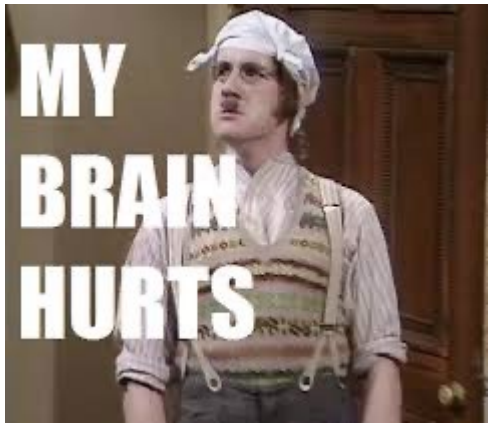
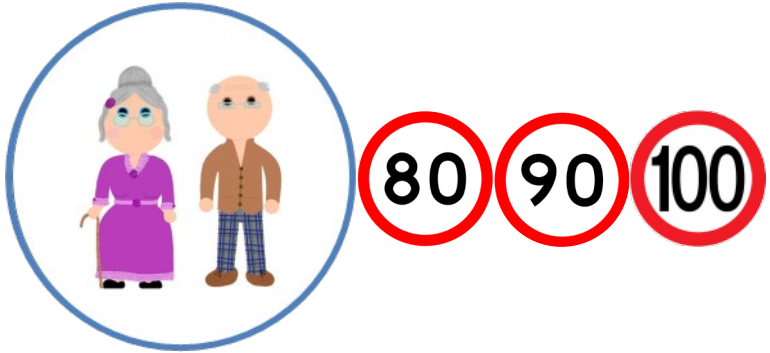
# QUESTIONS ?




# MERCI POUR VOTRE ATTENTION !