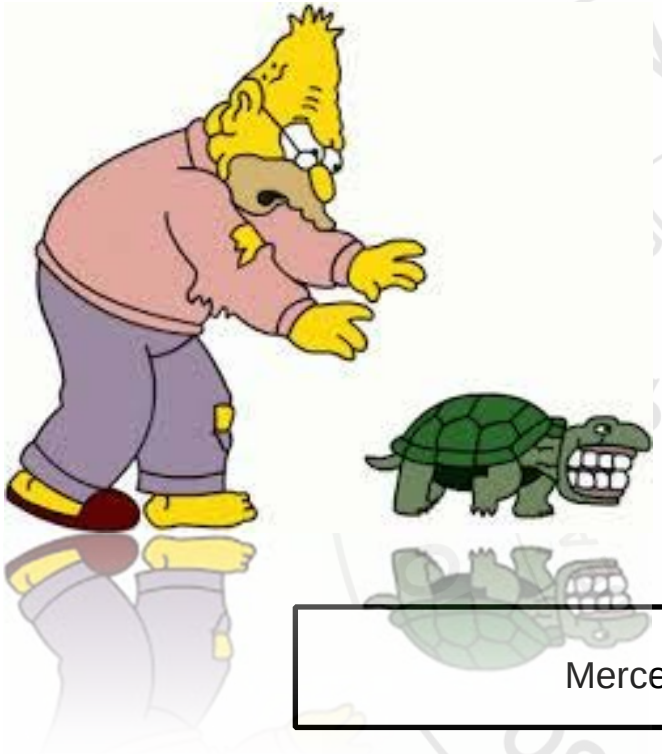

La **implicación del síndrome de fragilidad**, un estado de reserva homeostática disminuido, **en la evaluación del riesgo perioperatorio.**

Cristina Saiz Ruiz (MIR 4 SARTD)
Mercedes Murcia Anaya (Facultativo Especialista SARTD)

SARTD-CHGUV Sesión de Formación Continuada
Valencia 3 de Marzo de 2015

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¿Qué es?

Frailty in Older People

Lancet. 2013 March 2; 381(9868): 752–762.

La **Fragilidad**, es una entidad considerada **SÍNDROME**, y se caracteriza por:

-Un **estado de reserva fisiológica disminuida**.
-con **mayor vulnerabilidad a los factores de estrés.**

Esto provoca en los pacientes: debilidad, mala resolución de la homeostasis frente al estrés (ej: periodo perioperatorio), con empeoramiento de su estado basal, y mayor riesgo de sufrir complicaciones.

No es sinónimo de vejez y comorbilidad.

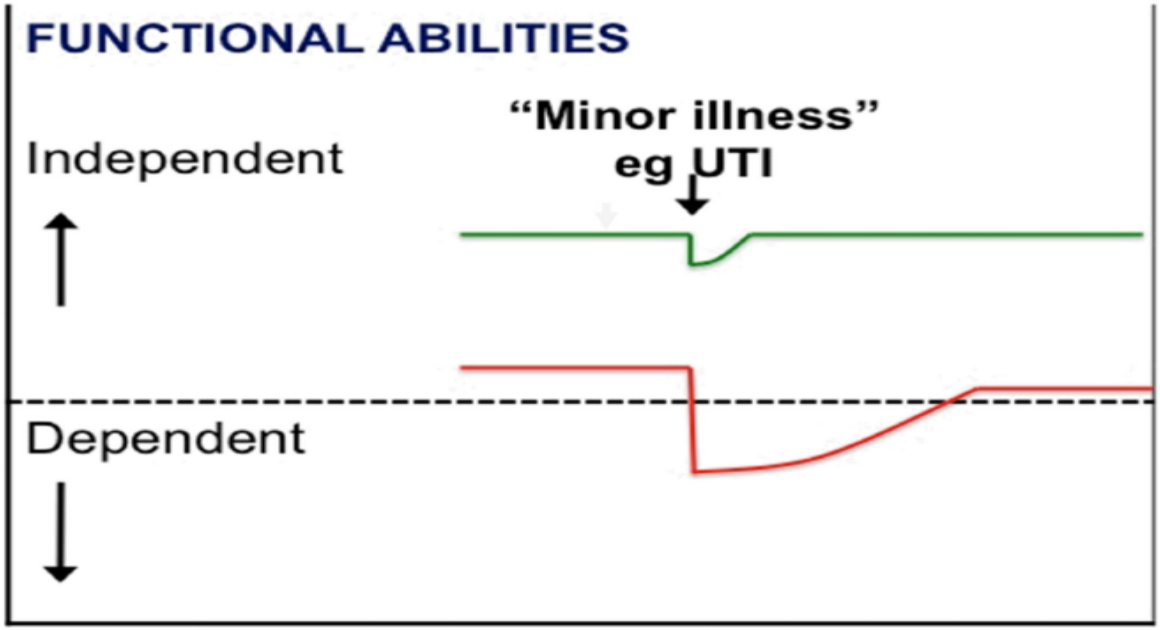
The implication of frailty on preoperative risk assessment

El envejecimiento humano es un **proceso multidimensional** de **disminución fisiológica** regulada por **genética, epigenética, y los factores ambientales**.

La **fragilidad** se caracteriza por el **rápido y patológico deterioro** de varios **sistemas fisiológicos y moleculares.**

La fragilidad es un **trastorno de múltiples sistemas fisiológicos inter-relacionados**. La gradual **disminución de la reserva fisiológica** que ocurre con el envejecimiento, en la **fragilidad se acelera y los mecanismos homeostáticos empiezan a fallar.**

Curr Opin Anesthesiol 2014, 27:330–335



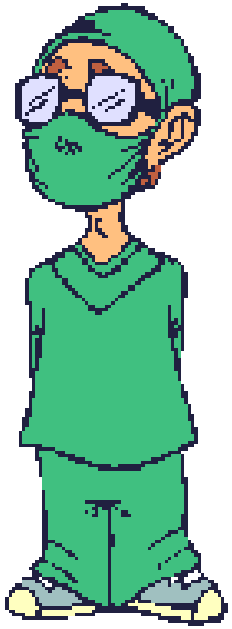


Figure 1.
Vulnerability of frail older people to a sudden change in health status following a minor illness. The green line represents a fit older person who, following a minor stress such as an infection, experiences a relatively small deterioration in function and then returns to homeostasis. The red line represents a frail older person who, following a similar stress, experiences a larger deterioration which may manifest as functional dependency and who does not return to baseline homeostasis.
Key: UTI: Urinary tract infection

Lancet. 2013 March 2; 381(9868): 752–762.

¿Por qué hablar de ello?

Los **pacientes de edad avanzada** son un subrgrupo **especial** dadas sus **características fisiopatológicas.**

Grupo **en aumento**, dada la **creciente** carga de **morbilidad quirúrgica** en este grupo.

40% de los procedimientos son en >65 años.

Predecir el **grupo de riesgo** y las probables **complicaciones postoperatorias,** condicionarán el **beneficio-riesgo** en la indicación de la cirugía.

Establecer el riesgo perioperatorio contribuye a **evitar complicaciones postoperatorias** y por tanto contribuye a **reducir costes, estancia hospitalaria y sufrimiento innecesario** al paciente.

¿Por qué hablar de ello?

El **estado de fragilidad** es:

-un **factor independiente** de complicaciones en el postoperatorio, institucionalización y muerte. Además de aumento de estancia hospitalaria.

Baby boomer

La implicación del síndrome de fragilidad, un estado de reserva homeostática disminuido, en la evaluación del riesgo perioperatorio

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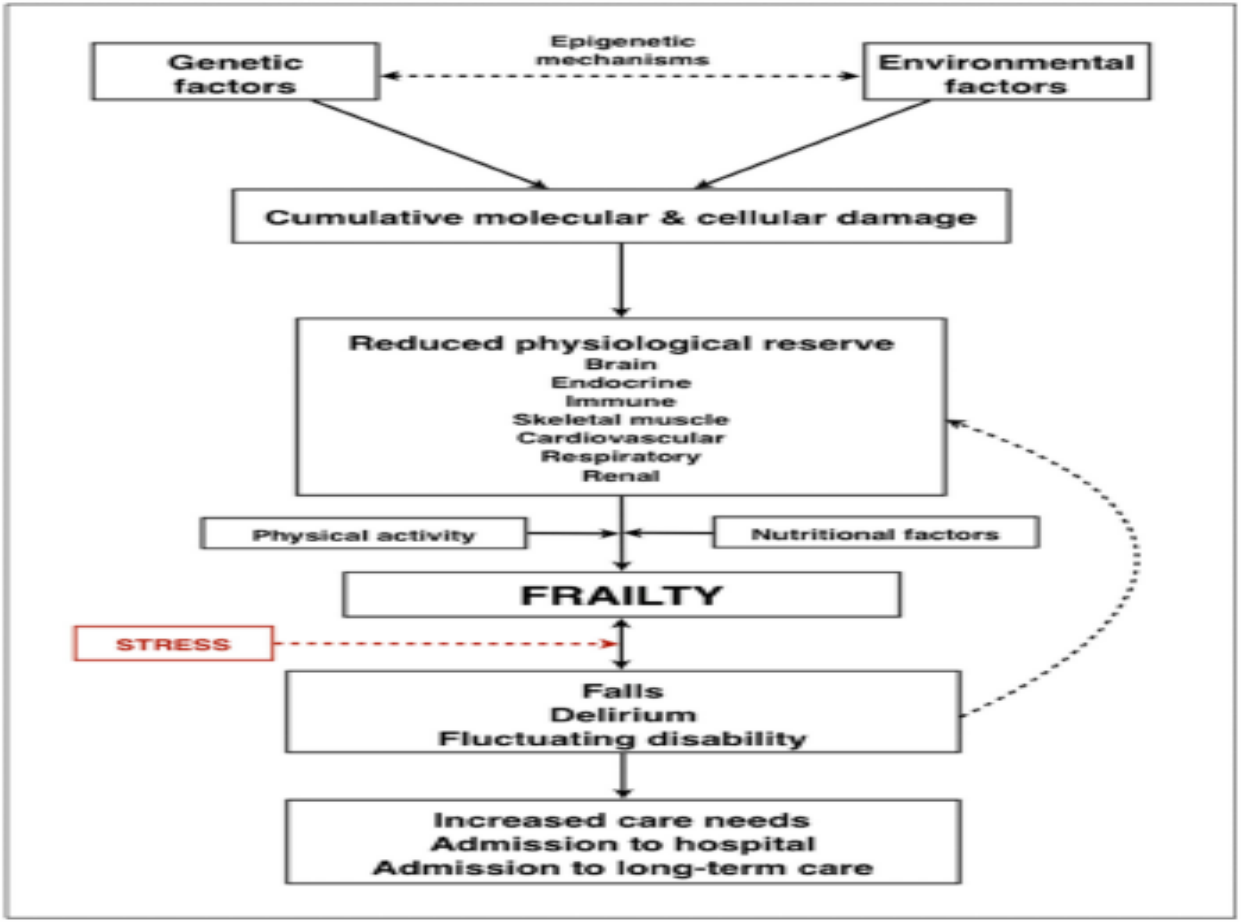
¿Cómo se desarrolla?

Lancet. 2013 March 2; 381(9868): 752–762.



Implicaciones clínicas

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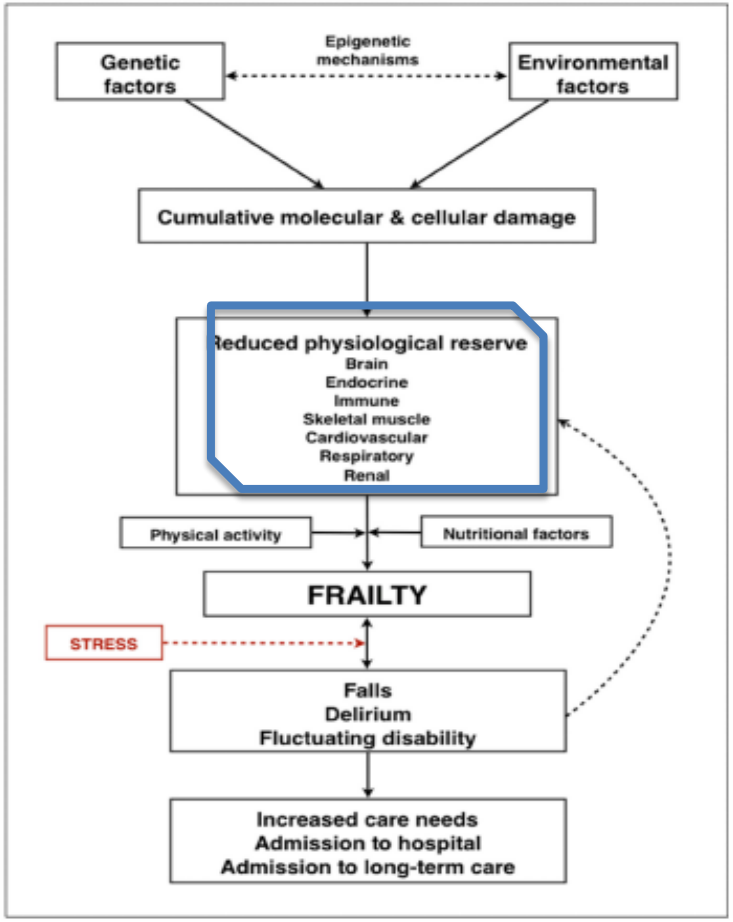

- La fragilidad del sistema inmune.
- La fragilidad "neurológica o cerebral".
- La fragilidad en el sistema endocrino.
- La fragilidad del aparato músculo esquelético y la sarcopenia

Implicaciones clínicas

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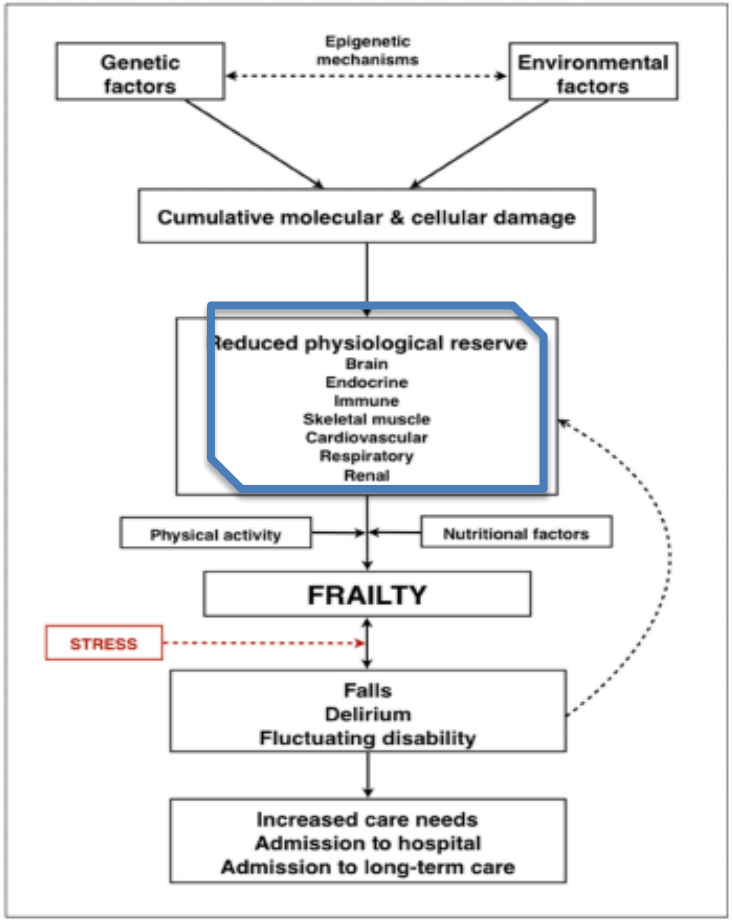

- La fragilidad del sistema inmune:
  - ↓Céls madre, alt en la producción de céls T, ↓respuesta de las céls B a Ac, ↓ actividad fagocítica de los neutrófilos, macrófagos y céls killers.
  - Insuficiente en el proceso inflamatorio agudo
  - Implicación de múltiples citoquinas: IL6, TNF α
  - Menor respuesta a vacunas Influenza y antipneumocócica

Implicaciones clínicas

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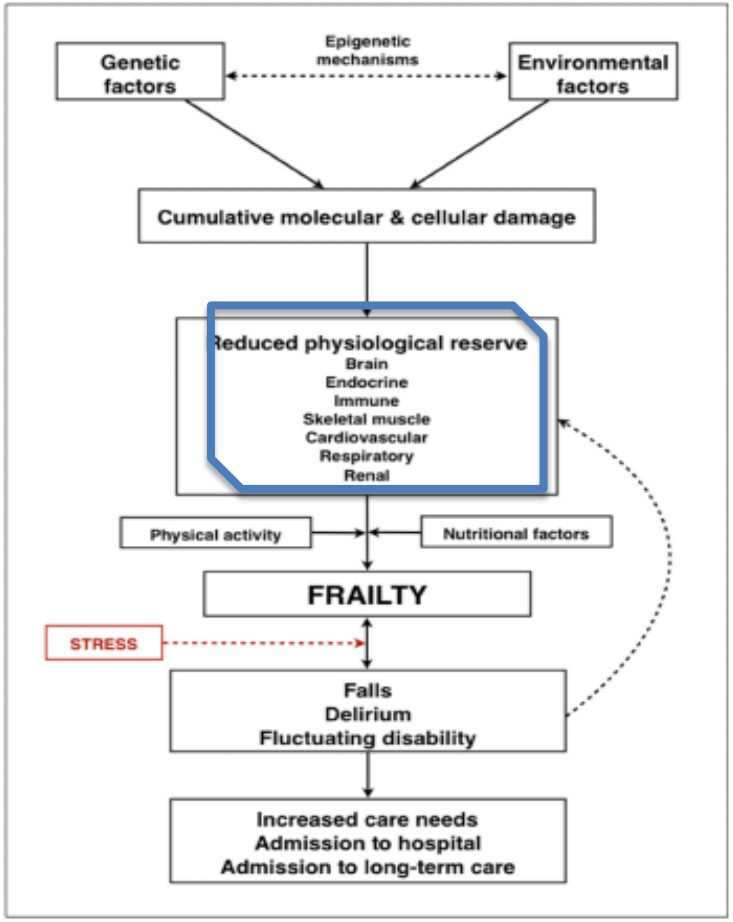

- La fragilidad "neurológica o cerebral":
  - Pérdida de neuronas con mayores necesidades metabólicas (ej hipocampo).
  - Cambios en la células de la microglia → Delirium
  - Asociación con deterioro cognitivo y demencia.

Implicaciones clínicas

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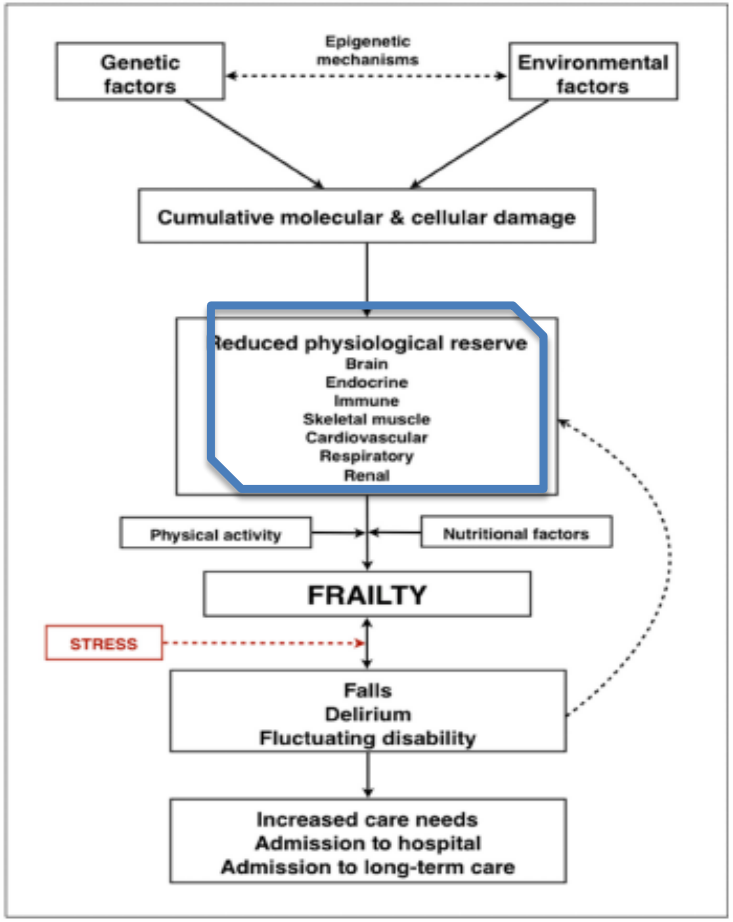

- La fragilidad en el sistema endocrino:
  - Interrelación eje hipotalamo – hipofisario

↓IGF-1
↓Estradiol y testosterona
↓DHEA /DHEAS

↑Cortisol
↑Catabolismo

  - Pérdida de masa muscular, anorexia, pérdida de peso, energía reducida.

Implicaciones clínicas

Lancet. 2013 March 2; 381(9868): 752–762.

El proceso se asocia con anorexia y catabolismo del músculo esquelético y tejido adiposo. Esto contribuye al compromiso nutricional, debilidad muscular y pérdida de peso, carácterísticas que definen el síndrome de fragilidad.

- La fragilidad del aparato músculo esquelético y la sarcopenia:
  - Sarcopenia
  - Interrelación de los sistemas neurológico, endocrino e inmune.
  - ↓Masa muscular y fuerza → ↓capacidad funcional.

Lancet. 2013 March 2; 381(9868): 752–762.

Common clinical presentations of frailty.

Non-specific:	Extreme fatigue, unexplained weight loss, frequent infections
Falls:	Balance and gait impairment are core features of frailty, and are important risk factors for falls. A "hot" fall is related to a minor illness that reduces postural balance below a critical threshold necessary to maintain gait integrity. "Spontaneous" falls occur in more severe frailty when vital postural systems (vision, balance, strength) are no longer consistent with safe navigation through undemanding environments. Spontaneous falls are typically repeated and are closely associated with the psychological reaction of "fear of further falls" so that the person develops severely impaired mobility.
Delirium:	Delirium (sometimes called acute confusion) is characterised by the rapid onset of fluctuating confusion and impaired awareness. It is related to a reduction in the integrity of brain function and is independently associated with adverse outcomes. Approximately 30% of older people admitted to hospital will develop delirium and the point prevalence estimate for delirium in long-term care is 15%.
Fluctuating disability:	Day-to-day instability resulting in patients with 'good', independent days, and 'bad' days on which (professional) care is often needed.

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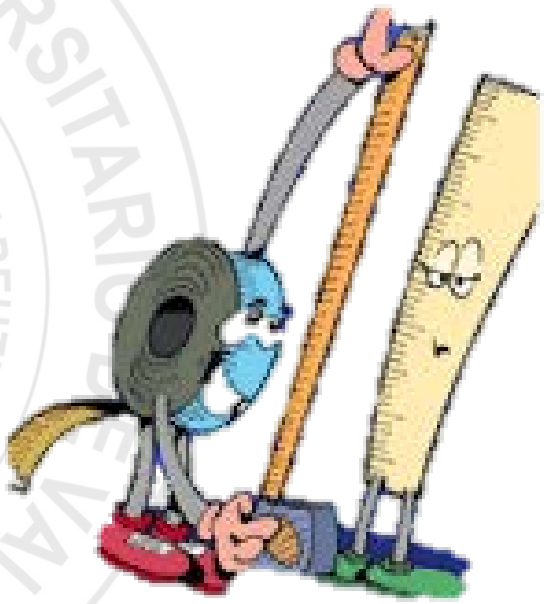
Modelos de fragilidad

REVIEW

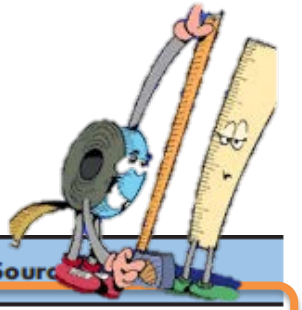
The implication of frailty on preoperative risk assessment

Curr Opin Anesthesiol 2014, 27:330–335

- Carácterísticas del índice ideal:
  - Sencillo y rápido de aplicar
  - Reproducible
  - Coste efectivo
  - Validado
  - Eficiente



¿Podemos medir la fragilidad?



Frailty measure	Description	Clinical outcome	Source
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Frailty Index/deficit accumulation	30–70 Measures of comorbidity, ADL, physical and neurological exam	Mortality and institutionalization	Mitnitski *et al.* [28], Rockwood *et al.* [29]
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Modelos de fragilidad

Lancet. 2013 March 2; 381(9868): 752–762.

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

Journal of Gerontology: MEDICAL SCIENCES
2001, Vol. 56A, No. 3, M146–M156

- De los Indicadores fenotípicos:

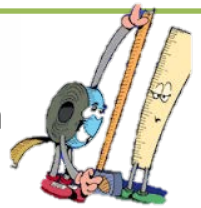
The five phenotype model indicators of frailty and their associated measures.

Frailty indictor	Measure
Weight loss	Self-reported weight loss of more than 10 pounds or recorded weight loss of ≥ 5% per annum
Self-reported exhaustion	Self-reported exhaustion on CES-D depression score (3-4 days per week or most of the time)
Low energy expenditure	Energy expenditure <383 KCal/week (males) or <270 KCal/week (females)
Slow gait speed	Standardised cut-off times to walk 15 feet, stratified for sex and height
Weak grip strength	Grip strength, stratified by sex and BMI

Key. CES-D, Center for Epidemiological Studies Depression; BMI, body mass index.

- 4-5: Frágil
- 2-3: Pre- frágil
- 0-1: Sólido /robusto

-Estudio de Cohorte prospectivo: Cardiovascular Health Study
-5.210 personas >65 años.
-Fenotipo de fragilidad, ausencia o presencia:
-Pérdida de peso no intencional.
-Agotamiento.
-Bajo gasto de energía.
-Movilidad enlentecida
-Debilidad en la fuerza de agarre.



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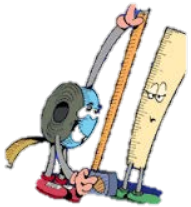

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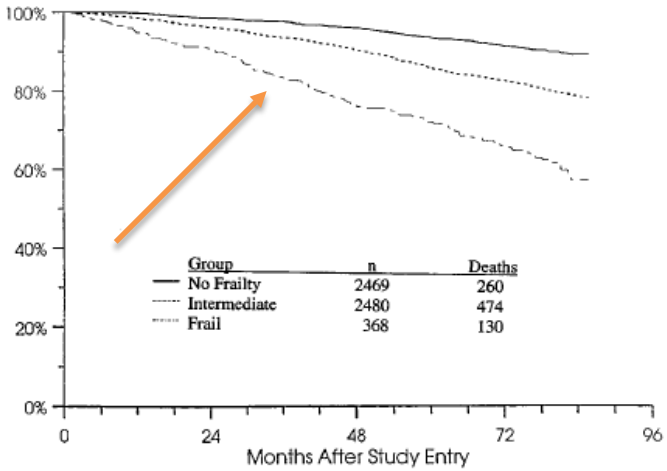

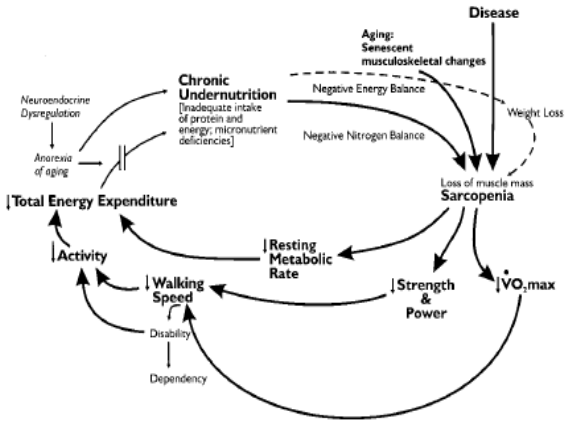

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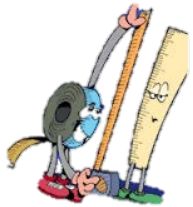
Modelos de fragilidad

Research Article
TheScientificWorld (2001) 1, 323–336
ISSN 1532-2246; DOI 10.1100/tsw.2001.58

The scientific World
www.thescientificworld.com

Accumulation of Deficits as a Proxy Measure of Aging



- **Índice Fragilidad –FI- o Déficit Acumulado:**
  - **92 variables (síntomas, valores anormales de laboratorio, discapacidad,…).**
  - Cálculo de la **presencia o ausencia de cada variable** como una **proporción del total.**
  - La fragilidad en este caso se define como el efecto acumulativo de los déficits individuales → **"a más déficits, más probabilidades hay de que sea frágil"**.
  - Los **déficits acumulativamente contribuyen a un mayor riesgo de muerte.** Esto es consistente con el aumento de la vulnerabilidad y la amenaza de insuficiencia homeostática inminente que es esencial para el concepto de fragilidad.
  - Clínicamente, permite la fragilidad ser considerada como **graduable** en vez que presente / ausente.

Modelos de fragilidad

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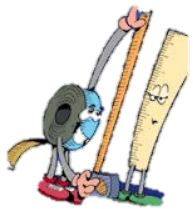

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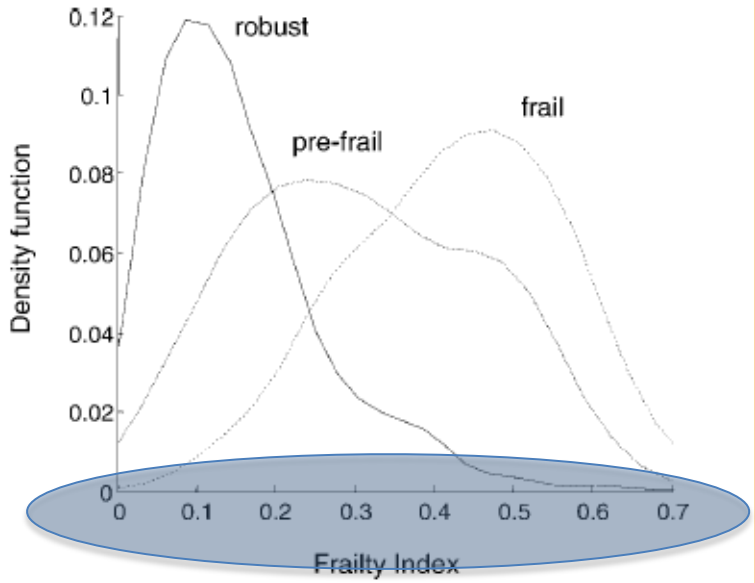

Figure 3. Density distributions of deficits, smoothed by a Gaussian kernel function, for people classified by the phenotypic definition as robust, pre-frail, or frail. The overlap in deficit accumulation between persons who are robust and those who are frail occurs close to the median of the robust, ~0.25.

El FI fue desarrollado como parte de Canadian Study Health and Aging (CSHA).
Estudio prospectivo, 5 años, n=10263 (82 años de edad media).
Objetivo: investigar epidemiología y carga de la demencia en personas mayores.

¿Podemos medir la fragilidad?

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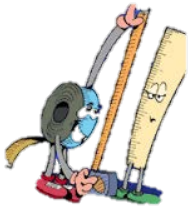
Modelos de fragilidad



- **<u>De los déficits (Índice Fragilidad MODIFICADO –FI-):</u>**
  - Reducción a 30 variables.
  - Más manejable.
  - Sin pérdida de validez predictiva.

Prevalence and 10-Year Outcomes of Frailty in Older Adults in Relation to Deficit Accumulation

Xiaowei Song, PhD, MSCS,† Arnold Mitnitski, PhD,*‡ and Kenneth Rockwood, MD, MPA*§*

JAGS 58:681–687, 2010

Modelos de fragilidad

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JAGS 58:681–687, 2010

- **De los déficits (Índice Fragilidad MODIFICADO –FI-)**

Table 2. Occurrence of the Individual Deficits and Their Odds Ratios for 10-Year Death

	%, Odds Ratio (95% Confidence Interval) *P*-Value	
Variable Description	Men (1,073)	Women (1,667)
Has long-term disability or handicaps	32.1, 2.37 (1.86–3.01) <.001	30.6, 1.34 (1.12–1.61).002
Restriction of activities	40.4, 2.29 (1.85–2.83) <.001	41.5, 1.21 (1.03–1.41).02
Needs help for preparing meals	6.3, 8.57 (3.92–18.75) <.001	7.8, 4.22 (2.70–6.58) <.001
Needs help for shopping for necessities	9.1, 5.79 (3.28–10.20) <.001	16.7, 3.16 (2.38–4.20) <.001
Needs help for house work	10.3, 6.79 (3.87–11.89) <.001	17.3, 1.93 (1.51–2.49) <.001
Needs help for heavy household chores	21.9, 4.11 (2.96–5.72) <.001	35.7, 1.63 (1.37–1.94) <.001
Needs help for personal care	4.6, 15.00 (4.66–48.27) <.001	5.2, 4.61 (2.64–8.06) <.001
Needs help moving about inside house	2.5, 11.50 (2.71–48.78) .001	2.6, 6.18 (2.61–14.66) <.001
Has arthritis or rheumatism	35.5, 1.55 (1.25–1.92) .01	48.8, 0.95 (0.79–1.06) .23
Has high blood pressure	23.7, 1.48 (1.14–1.92) .003	33.6, 0.88 (0.74–1.05) .15
Has chronic bronchitis or emphysema	8.3, 2.25 (1.76–4.64) <.001	6.1, 1.25 (0.82–1.89) .30
Has diabetes mellitus	11.7, 1.79 (1.24–2.59) .07	9.5, 1.92 (1.37–2.69) .001
Has heart disease	18.7, 2.38 (1.75–3.24) <.001	16.5, 1.46 (1.13–1.89) .004
Has cancer	5.1, 3.07 (1.64–5.73) <.001	5.4, 1.50 (1.07–2.10) .007
Has stomach or intestinal ulcers	5.6, 1.90 (1.10–3.26) .02	5.2, 1.19 (0.77–1.84) .44
Suffers from the effect of stroke	3.9, 5.65 (2.37–13.43) <.001	3.5, 1.54 (0.90–2.64) .11
Suffers from urinary incontinence	3.1, 2.49 (1.10–5.65) .29	4.5, 1.53 (0.95–2.47) .08
Has migraine headache	2.9, 1.89 (0.88–4.07) .10	5.1, 0.95 (0.60–1.49) .81
Has cataracts	9.6, 2.09 (1.37–3.18) .001	18.3, 1.23 (0.97–1.56) .09
Has glaucoma	3.4, 1.40 (0.72–2.71) .32	5.2, 1.39 (0.89–2.18) .15
Has other medical conditions	8.2, 1.42 (0.91–2.22) .12	8.5, 0.94 (0.66–1.33) .72
Have no regular physical exercise	48.8, 1.77 (1.46–2.14) <.001	55.7, 1.13 (0.98–1.30) .08
Has vision problem	5.6, 1.87 (1.08–3.23) .03	9.4, 2.01 (1.42–2.85) <.001
Has hearing problem	8.3, 2.75 (1.70–4.46) <.001	7.0, 1.43 (0.97–2.11) .07
Feeling hopeless	3.8, 2.19 (1.06–4.56) .04	6.2, 1.65 (1.08–2.54) .02
Has dexterity problem	2.9, 5.52 (1.86–16.35) .02	2.8, 2.01 (1.07–4.00) .03
Has emotional problem	4.3, 2.05 (1.08–3.91) .03	4.0, 1.56 (0.89–2.56) .12
Has memory problem	34.2, 1.80 (1.44–2.24) <.001	33.8, 0.85 (0.71–1.01) .06
Has bodily pain	26.4, 1.78 (1.38–2.31) .01	29.5, 1.04 (0.87–1.26) .66
Has speech problem	2.1, 3.29 (1.20–9.04) .02	1.5, 0.71 (0.32–1.60) .41
Taking 5 or more medications	10.6, 4.61 (2.74–7.76) <.001	13.0, 1.53 (1.13–1.53) .006
Has difficulty carrying or lifting light loads	30.3, 2.41 (1.89–3.07) <.001	31.7, 1.52 (1.26–1.82) <.001
Mobility problem	13.0, 4.98 (3.16–7.84) <.001	17.1, 2.34 (1.80–3.05) <.001
Has limited kind or amount of activity	30.2, 2.58 (2.01–3.30) <.001	33.7, 1.27 (1.07–1.51) .007
Feels tired all the time	8.4, 1.63 (1.09–3.31) .03	7.4, 1.58 (1.23–2.80) <.001
Weight loss	4.3, 2.15 (0.59–3.80) .48	3.9, 1.42 (1.15–2.46) <.001

La implicación del síndrome de fragilidad, un estado de reserva homeostática disminuido, en la evaluación del riesgo perioperatorio

Objetivos

- Qué es y por qué hablar de ello.
- Cómo se desarrolla y sus implicaciones clínicas.
- Podemos medir la fragilidad: Índices.
- Implicación en la evaluación del riesgo perioperatorio.
- Manejo.
- Conclusiones.

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¿Qué valorar en el preoperatorio de pacientes susceptibles de fragilidad?

SARTD-CHGUV Sesión de Formación Continuada
Valencia 3 de Marzo de 2015

El anciano en el preoperatorio…

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http://dx.doi.org/10.1016/j.jamcollsurg.2012.06.017

- Recomendaciones preoperatorias
- Programa Nacional de Mejora de la calidad Quirúrgica del Colegio Americano de Cirujanos y la Sociedad Americana de Geriatria (ACS NSQIP /AGS).
- Equipo Multidisciplinar.

Checklist preoperatorio…

Table 1. Checklist for the Optimal Preoperative Assessment of the Geriatric Surgical Patient

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- ☐ Assess the patient's **cognitive ability** and **capacity** to understand the anticipated surgery.
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- Historia clínica detallada.
- Reflejar en preoperatorio estado cognitivo previo.
- SI deterioro reciente o no filiado valorar remitir a especialista (MAP, geriatria o Salud Mental).
- Valorar capacidad de entregar consentimiento informado.
- Se recomienda hacer screening para depresión y remitir para tratamiento si procede.

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-Hasta el 10 % de los pacientes sometidos a cirugía mayor no cardíaca.

-> 40 % de los pacientes que requieren UCI en el postoperatorio.

-Identificar y documentar factores de riesgo.

-Evitar administración de BZD, antihistamínicos

Checklist preoperatorio…

Table 5. Risk Factors for Postoperative Delirium[10,11,20,21,33-40]

Cognitive and behavioral disorders
Cognitive impairment and dementia
Untreated or inadequately controlled pain
Depression
Alcohol use
Sleep deprivation
Disease- or illness-related
Severe illness or comorbidities
Renal insufficiency
Anemia
Hypoxia
Metabolic
Poor nutrition
Dehydration
Electrolyte abnormalities
Functional impairments
Poor functional status
Immobilization
Hearing or vision impairment
Other
Older age ≥ 70 y
Polypharmacy and use of psychotropic medications (benzodiazepines, anticholinergics, and antihistamines)
Risk of urinary retention or constipation, presence of urinary catheter

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El **delirium postoperatorio** se asocia con una **mayor mortalidad y complicaciones**, tasas de **institucionalización**, mayores **costes** y utilización de los **recursos hospitalarios**, estancias más largas, y **recuperación mas comprometida.**

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- Valorar añadir tratamientos multivitamínicos (ácido fólico, tiamina) en pacientes con consumo severo de alcohol.

- Evaluación del riesgo cardíaco de acuerdo con los algoritmos vigentes para cirugía no cardíaca

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- Identificar factores de riesgo para complicaciones postoperatorias.
- Establecer medidas correctoras para prevenir dichas complicaciones.
- Frecuencia en torno 6-7 %

Checklist preoperatorio…

Table 6. Risk Factors for Postoperative Pulmonary Complications

Patient-related factors
Age > 60 y[55-60]
Chronic obstructive pulmonary disease (COPD)[55,56,58-60]
American Society of Anesthesiologists (ASA) class II or greater[56,58,59]
Functional dependence*[55,58-60]
Congestive heart failure[56,58,59]
Obstructive sleep apnea[58,59,61]
Pulmonary hypertension[62-64]
Current cigarette use[58-60]
Impaired sensorium†[56,58-60]
Preoperative sepsis[56]
Weight loss > 10% in 6 months[58-60]
Serum albumin < 3.5 mg/dL[55,56,58,59]
Blood urea nitrogen (BUN) ≥ 7.5 mmol/L (≥21 mg/dL)[58-60]
Serum creatinine >133 μmol/L (>1.5 mg/dL)[59,66]
Surgery-related factors
Prolonged operation > 3 h[57-59]
Surgical site‡[55,56,58-60]
Emergency operation[55,56,58-60]
General anesthesia[58-60]
Perioperative transfusion[56,58-60]
Residual neuromuscular blockade after an operation[58,65]
Not risk factors
Obesity[58,59]
Well-controlled asthma[58,59]
Diabetes[58,59]

*Total dependence was the inability to perform any activities of daily living. Partial dependence was the need for equipment or devices and assistance from another person for some activities of daily living.
†Acutely confused or delirious patient who is able to respond to verbal or mild tactile stimulation, or mental status changes or delirium in the context of current illness.
‡Highest risk procedures: upper abdominal, thoracic, neurosurgical, head and neck, vascular (eg, aortic aneurysm repair).

Table 7. Preoperative Strategies for Preventing Postoperative Pulmonary Complications

1. Preoperative optimization of pulmonary function in patients with COPD and asthma that is not well controlled[68,73]
2. Smoking cessation*[64,67,70-72]
3. Preoperative intensive inspiratory muscle training†[64,69]
4. Selective chest radiograph and pulmonary function tests‡[58,73]

*Regarding the timing of smoking cessation, one study showed increased rates of postoperative pulmonary complications (PPCs) in patients who stop smoking within 8 weeks of surgery; another study found that smoking cessation was beneficial as late as 4 weeks before surgery; a meta-analysis found no increase risk in PPCs with cessation within 8 weeks of surgery.
†Based on one single-blinded randomized control trial of patients undergoing elective coronary artery bypass grafting (CABG).
‡Routine chest radiographs and pulmonary function tests are not recommended.

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- Capacidad para realizar actividades diarias.
- Identificar limitaciones funcionales.
- Reflejar cualquier deficit de visión, oído, deglutorio, etc.
- Historial de caídas.
- Identificar limitaciones en la marcha y movilidad.

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Table 10. Frailty Score (Operational Definition)[91]

Criteria	Definition
Shrinkage	Unintentional weight loss ≥ 10 past year
Weakness	Decreased grip strength
Exhaustion	Self-reported poor energy and endurance
Low physical activity	Low weekly energy expenditure
Slowness	Slow walking

The patient receives 1 point for each criterion met: 0 to 1, not frail; 2 to 3, intermediate frail (pre-frail); 4 to 5, frail.
(Adapted from Makary MA, Segev DL, Pronovost PJ, et al. Frailty as a predictor of surgical outcomes in older patients. J Am Coll Surg 2010;210: 901–908, with permission).

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- Evaluación del estado nutricional.
- Reflejar peso, altura e IMC.
- Reflejar pérdidas de peso no intencionales.
- Identificar factores de riesgo de malnutrición severa.

IMC < 18 kg/m2
Albúmina < 3,0 g/dl
Pérdida peso 10-15% en 6 m

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- Revisar y documentar toda la medicación del paciente.
- Identificar medicación que debe ser interrumpida o retirada.
- Ajustar dosis tratamientos.
- Evitar fármacos en pacientes con riesgo de delirio postoperatorio.
- Monitorizar la polimedicación y sus posibles interacciones.

Checklist preoperatorio…

Table 1. Checklist for the Optimal Preoperative Assessment of the Geriatric Surgical Patient

In addition to conducting a complete history and physical examination of the patient, the following assessments are strongly recommended:

- ☐ Assess the patient's **cognitive ability** and **capacity** to understand the anticipated surgery.
- ☐ Screen the patient for **depression**.
- ☐ Identify the patient's risk factors for developing postoperative **delirium**.
- ☐ Screen for **alcohol** and other **substance abuse/dependence**.
- ☐ Perform a preoperative **cardiac** evaluation according to the American College of Cardiology/American Heart Association algorithm for patients undergoing noncardiac surgery.
- ☐ Identify the patient's risk factors for postoperative **pulmonary** complications and implement appropriate strategies for prevention.
- ☐ Document **functional status** and history of **falls**.
- ☐ Determine baseline **frailty** score.
- ☐ Assess patient's **nutritional status** and consider preoperative interventions if the patient is at severe nutritional risk.
- ☐ Take an accurate and detailed **medication history** and consider appropriate perioperative adjustments. Monitor for **polypharmacy**.
- ☐ Determine the patient's **treatment goals** and **expectations** in the context of the possible treatment outcomes.
- ☐ Determine patient's **family** and **social support system**.
- ☐ Order appropriate preoperative **diagnostic tests** focused on elderly patients.

SPECIAL ARTICLE

Optimal Preoperative Assessment of the Geriatric Surgical Patient: A Best Practices Guideline from the American College of Surgeons National Surgical Quality Improvement Program and the American Geriatrics Society

Warren B Chow, MD, MS, MSHSOR, Ronnie A Rosenthal, MD, MS, FACS, Ryan P Merkow, MD, MSHSOR, Clifford Y Ko, MD, MS, MSHS, FACS, Nestor F Esnaola, MD, MPH, MBA, FACS

- Identificar pacientes con directivas o voluntades previas.
- Discutir si procede, el posible deterioro funcional y necesidad de rehabilitación o cuidados postoperatorios si es el caso.
- Identificar situaciones de apoyo social insuficiente y valorar remitir a trabajador social.

Checklist preoperatorio…

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Table 13. Preoperative Tests Recommended for All Geriatric Surgical Patients[10,11,109-111]

Preoperative tests	Indications
Hemoglobin	Recommended for all geriatric surgical patients, especially those: Undergoing operations with anticipated clinically significant blood loss or transfusion requirement. With suspected or known severe anemia.
Renal function tests (blood urea nitrogen, creatinine)	Recommended for all geriatric surgical patients, especially those: Undergoing major surgery.* With diabetes, hypertension, cardiovascular disease, or who use medications that affect renal function (angiotensin-converting enzyme [ACE] inhibitors, NSAIDS).
Serum albumin	Recommended for all geriatric surgical patients, especially those: With known liver disease, multiple serious chronic illnesses, and recent major illness. Undergoing major surgery. Likely to have malnutrition.

*Major surgery includes cardiac, vascular, thoracic, and abdominal operations.

Checklist preoperatorio ...

Table 14. Preoperative Laboratory Tests Recommended for Selected Geriatric Surgical Patients

Preoperative tests	Indications*
White blood cell count (WBC)	Known or suspected infection or myeloproliferative disease, or at high risk for leukopenia from drugs or other known disease.[11,111]
	May be included as part of a complete blood count.
Platelet count	High likelihood of thrombocytopenia or thrombocytosis.
	May be included as part of a complete blood count.
Coagulation tests (PT/INR/PTT)	History of bleeding disorders, on medications affecting coagulation, on warfarin, or on hemodialysis.[11,110,111,114]
	Undergoing specific types of surgery, such as arterial reconstruction, cardiac surgery, cancer operations, and ones in which small amounts of bleeding can cause dramatic complications (neurosurgical or orthopaedic spine procedures).[11,110]
	Malnutrition, malabsorption, or liver disease.[11,110,111,114]
Electrolytes (Na, K, Cl, CO_2)	Baseline renal insufficiency, congestive heart failure.
	Taking diuretics, digoxin, angiotensin-converting enzyme (ACE) inhibitors, or other medications that increase likelihood of abnormal results.[11,111]
Serum glucose	Known or suspected diabetes, or obesity.[111]
Urinalysis	Suspected urinary tract infection[11,111], known diabetes[111], or undergoing urogenital surgery.[110]

*These test are NOT RECOMMENDED for routine preoperative screening.[11,49,73,110,113,114,117]
INR, international normalized ratio; PT, prothrombin time; PTT, partial thromboplastin time.

Table 15. Preoperative Imaging and Body Functional Tests Recommended for Selected Geriatric Surgical Patients

Preoperative tests	Indications*
Chest radiograph (CXR)[110,113]	Acute cardiopulmonary disease (including smoking, asthma, and COPD)
	>70 years old with history of stable chronic cardiopulmonary disease without recent CXR in past 6 months
	Possible ICU stay – obtain for baseline CXR
	Undergoing major surgery†
Electrocardiograms (ECG)[11,49,110,111]	Undergoing intermediate-risk or vascular surgery.
	Known ischemic heart disease, previous myocardial infarction, cardiac arrhythmias, peripheral vascular disease, cerebrovascular diseases, compensated or prior heart failure, diabetes, renal insufficiency, or respiratory disease.
Pulmonary function tests (PFT)	Undergoing lung resection.[11,73,112]
	Poorly characterized dyspnea or exercise intolerance with diagnostic uncertainty between cardiac or pulmonary limitation vs simple deconditioning.[59,117]
	Obstructive lung disease with questionable preoperative optimization.[59,117]
Noninvasive stress testing[49]	≥3 clinical risk factors and poor functional capacity (less than 4 METs) undergoing vascular surgery
	≥1 clinical risk factor and poor functional capacity (less than 4 METs) undergoing intermediate risk or vascular surgery, if it will change management.

*These test are NOT RECOMMENDED for routine preoperative screening.[11,49,73,110,113,114,117]
†Major surgery includes cardiac, thoracic, abdominal, and some esophageal, thyroidectomy, head and neck, neurosurgery, and lymph node operations.
MET, metabolic equivalent.

¿Qué implicación tiene el síndrome de fragilidad en la evaluación del riesgo perioperatorio?

SARTD-CHGUV Sesión de Formación Continuada
Valencia 3 de Marzo de 2015

¿Mayor riesgo perioperatorio?

Frailty as a Predictor of Surgical Outcomes in Older Patients

Martin A Makary, MD, MPH, FACS, Dorry L Segev, MD, PhD, FACS, Peter J Pronovost, MD, PhD, Dora Syin, MD, Karen Bandeen-Roche, PhD, Purvi Patel, MD, MPH, Ryan Takenaga, MD, Lara Devgan, MD, MPH, Christine G Holzmueller, BLA, Jing Tian, MS, Linda P Fried, MD, MPH

(J Am Coll Surg 2010;210:901–908.

- **La evaluación** del **riesgo preoperatorio** es actualmente **inexacta** en **pacientes mayores** por la <u>dificultad de medir la reserva fisiológica.</u>
- La **fragilidad intenta estimar la carencia de estas reservas fisiológicas**, aunque su uso no ha sido evaluado en pacientes quirúrgicos.
- Se diseña este **estudio para determinar si la fragilidad predice complicaciones quirúrgicas** y mejora los modelos actuales de riesgo perioperatorio.
- Utiliza el método de medición según el **fenotipo.**

¿Mayor riesgo perioperatorio?

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(J Am Coll Surg 2010;210:901–908.

Índices habituales….

- Principales inconvenientes:
  - Se basan en un sistema de un solo órgano.
  - Y/ o son subjetivos.
  - Ninguno estima las reservas fisiológicas de un paciente.

- ¿Cuáles son los actuales métodos utilizados para estimar el riesgo perioperatorio?

Clasificación del estado físico de la American Society of Anesthesiology (ASA)

ASA I: Sano
El paciente no padece ninguna alteración fisiológica, bioquímica o psiquiátrica. El proceso que motiva la intervención está localizado y no tiene repercusiones sistémicas

ASAII: Enfermedad leve que no limita la actividad diaria
Alteración sistémica leve o moderada secundaria al proceso que motiva la intervención o a cualquier otro proceso fisiopatológico. Los niños pequeños y los ancianos se incluyen en este grupo aunque no padezcan ninguna otra enfermedad sistémica. Se incluye también a los pacientes obesos no mórbidos y con bronquitis crónica

ASA III: Enfermedad grave que limita la actividad diaria
Procesos sistémicos graves de cualquier tipo, incluidos aquellos en los que no es posible definir claramente el grado de incapacidad

ASA IV: Enfermedad grave que amenaza la vida
Trastornos sistémicos graves y potencialmente mortales, no siempre corregibles quirúrgicamente

ASA V: Improbable que sobreviva más de 24 h a pesar de la cirugía
Paciente moribundo y con poca posibilidad de supervivencia, requiere cirugía desesperada. En muchos casos, la cirugía se considera una medida de reanimación y se realiza con anestesia mínima o nula

Factores de riesgo
1) Cirugía de alto riesgo
2) Historia de ACV / TIA
3) Cardiopatía isquémica (no revascularizada)
4) Insulina preoperatorio
5) Historia de insuficiencia cardíaca
6) Creatinina > 2 mg%

Clase	Tasa eventos (IC 95%)
I (0 factor de riesgo)	0,4 (0,05-1,5)
II (1 factor de riesgo)	0,9 (0,3-2,1)
III (2 factores de riesgo)	6,6 (3,9-10,3)
IV (3 o más factores de riesgo)	11,0 (5,8-18,4)

Indice de riesgo cardiaco revisado Lee

¿Mayor riesgo perioperatorio?

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(J Am Coll Surg 2010;210:901–908.

Table 3. Risk of Surgical Complications by Frailty

Adjustment	Intermediately frail patients, odds ratio (95% CI)	Frail patients, odds ratio (95% CI)
Operation category*	2.02 (1.22–3.34)	3.12 (1.48–6.57)
Operation category and ASA score	2.13 (1.27–3.59)	3.15 (1.47–6.72)
Operation category and Lee score†	1.99 (1.19–3.33)	2.68 (1.23–5.87)
Operation Category and Eagle score†	1.78 (1.06–3.02)	2.72 (1.25–5.90)
Adjusted for all factors (parsimonious model)	1.97 (1.16–3.35)	2.48 (1.11–5.56)
Adjusted for all factors (forced model)	2.06 (1.18–3.60)	2.54 (1.12–5.77)

- La fragilidad se comportó como un predictor independiente de complicaciones quirúrgicas

Table 4. Increased Length of Hospital Stay by Frailty

Adjustment	Intermediately frail patients, IRR (95% CI)	Frail patients, IRR (95% CI)
Operation category*	1.53 (1.28–1.83)	1.89 (1.43–2.48)
Operation category and ASA score	1.50 (1.25–1.79)	1.80 (1.36–2.37)
Operation category and Lee score	1.51 (1.26–1.80)	1.74 (1.32–2.30)
Operation category and Eagle score	1.44 (1.2–1.73)	1.65 (1.25–2.18)
Adjusted for all factors (parsimonious model)	1.49 (1.24–1.80)	1.67 (1.27–2.21)
Adjusted for all factors (forced model)	1.49 (1.24–1.80)	1.69 (1.28–2.23)

- La fragilidad se comportó como un factor independiente en aumentar la estancia hospitalaria

¿Mayor riesgo perioperatorio?

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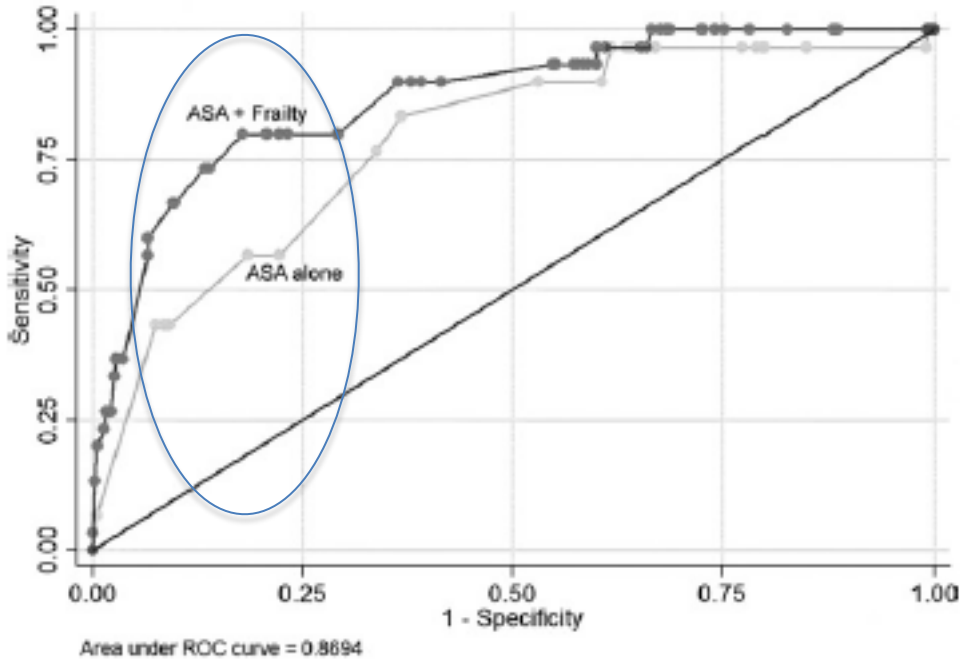

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Valencia 3 de Marzo de 2015

CIRUGÍA ABDOMINAL Y FRAGILIDAD

ORIGINAL ARTICLE

Annals of Surgery • Volume 253, Number 6, June 2011

Preoperative Frailty and Quality of Life as Predictors of Postoperative Complications

Adrienne Saxton, BS, and Vic Velanovich, MD

TABLE 4. Univariate Analysis of Postoperative Complications, Odds Ratios with 95% Confidence Interval

Risk Factor	Any Morbidity	Clavien Class II–V	Postoperative Death
Frailty index >0.12	1.48 (1.10–1.99) P = 0.02	1.37 (0.88–2.13) P = NS	0.55 (0.07–4.12) P = NS
Health transition* Worse or much worse	1.10 (0.84–1.45) *P* = NS	1.24 (0.86–1.79) *P* = NS	1.83 (0.59–5.59) *P* = NS
Physical functioning <1SD†	1.04 (0.79–1.37) *P* = NS	1.16 (0.80–1.67) *P* = NS	1.43 (0.48–4.30) *P* = NS
Role physical <1SD	1.11 (0.84–1.46) *P* = NS	1.04 (0.72–1.50) *P* = NS	2.43 (0.75–7.84) *P* = NS
Role emotional <1SD	1.23 (0.93–1.61) *P* = NS	1.26 (0.87–1.82) *P* = NS	5.46 (1.53–19.65) *P* = 0.003
Bodily pain <1SD	0.77 (0.58–1.02) *P* = NS	0.65 (0.44–0.97) *P* = 0.03	0.40 (0.11–1.43) *P* = NS
Vitality <1SD	1.17 (0.88–1.55) *P* = NS	1.09 (0.74–1.62) *P* = NS	1.80 (0.59–5.46) *P* = NS
Mental health <1SD	1.03 (0.76–1.39) *P* = NS	1.16 (0.79–1.71) *P* = NS	2.52 (0.84–7.52) *P* = NS
Social functioning <1SD	0.92 (0.65–1.28) *P* = NS	0.84 (0.53–1.33) *P* = NS	2.26 (0.75–6.84) *P* = NS
General health <1SD	1.17 (0.88–1.55) *P* = NS	1.15 (0.79–1.68) *P* = NS	1.96 (0.65–5.88) *P* = NS

*Health transition item: Compared with 1 year ago, how would you rate your health in general now?
†SD, standard deviation from mean for general reference population.[11]

El estudio funcional preoperatorio (medido entre otros con el Indice de Fragilidad) puede ayudar a identificar a los pacientes con mayor riesgo de complicaciones posoperatorias.

CIRUGÍA CARDÍACA Y FRAGILIDAD

What is the utility of preoperative frailty assessment for risk stratification in cardiac surgery?

Nigel Mark Bagnall*, Omar Faiz, Ara Darzi and Thanos Athanasiou

Interactive CardioVascular and Thoracic Surgery 17 (2013) 398–402
doi:10.1093/icvts/ivt197 Advance Access publication 10 May 2013

- Este estudio trata de determinar la utilidad de determinar la fragilidad preoperatoria en la predicción de la supervivencia y complicaciones, ya sea por separado o combinación con otros scores convencionales utilizados en cirugía cardíaca.
- Resultados variables en cuanto a superioridad respecto a otros scores convencionales.
- En general, se relaciona con mayor indice de eventos adversos en el postoperatorio.
- Factor independiente de mortalidad.

Predictor de riesgo perioperatorio

Am J Surg. 2013 October ; 206(4): 544–550. doi:10.1016/j.amjsurg.2013.03.012.

Simple Frailty Score Predicts Post-Operative Complications Across Surgical Specialties

Thomas N Robinson, MD, FACS[1,3], Daniel S Wu, MD[1,3], Lauren Pointer, MS[4], Christina L Dunn, BA[1], Joseph C Cleveland Jr., MD[1,3], and Marc Moss, MD[2]

[1]Department of Surgery, University of Colorado at Denver School of Medicine, Aurora, CO

[2]Department of Medicine, University of Colorado at Denver School of Medicine, Aurora, CO

[3]Department of Surgery, Denver Veteran's Affairs Medical Center, Denver, CO

[4]Department of Biostatistics, Denver Veteran's Affairs Medical Center, Denver, CO

Cirugía colorrectal y cirugía cardíaca

ELECTIVA: 201 pacientes.

Indice de fragilidad basado en la presencia de 7 parámetros o variables:

Baseline Frailty and Post-Operative Outcomes

	Total	Non-Frail	Pre-Frail	Frail	p-value
Colorectal Operations	(n=72)	(n=33)	(n=15)	(n=24)	
One or more complications	38% (27)	21% (7)	40% (6)	58% (14)	0.016
Cardiac	3% (2)	0% (0)	0% (0)	8% (2)	
DVT	1% (1)	0% (0)	0% (0)	4% (1)	
Sepsis	11% (8)	3% (1)	7% (1)	25% (6)	
Post-Op Infection	25% (18)	18% (6)	27% (4)	33% (8)	
Renal Disease	3% (2)	0% (0)	0% (0)	8% (2)	
Respiratory	8% (6)	0% (0)	0% (0)	25% (6)	
Neurological	1% (1)	0% (0)	0% (0)	4% (1)	
Re-Operation	8% (6)	3% (1)	0% (0)	21% (5)	
Hospital Stay (days)	9±8.0	6±3.6	8±6.1	14±11.0	<0.001
30-Day Readmission	15% (11)	6% (2)	20% (3)	29% (7)	0.046
Cardiac Operations	(n=129)	(n=72)	(n=25)	(n=32)	
One or more complications	29% (37)	17% (12)	28% (7)	56% (18)	<0.001
Cardiac	4% (5)	1% (1)	4% (1)	9% (3)	
DVT	2% (2)	1% (1)	0% (0)	3% (1)	
Sepsis	3% (4)	4% (3)	0% (0)	3% (1)	
Post-Op Infection	13% (17)	8% (6)	8% (2)	28% (9)	
Renal Disease	4% (5)	1% (1)	0% (0)	13% (4)	
Respiratory	5% (6)	3% (2)	4% (1)	9% (3)	
Neurological	2% (3)	1% (1)	0% (0)	6% (2)	
Re-Operation	5% (7)	6% (4)	4% (1)	6% (2)	
Hospital Stay (days)	10±5.5	9±4.5	10±4.4	12±7.5	0.026
30-Day Readmission	14% (18)	7% (5)	16% (4)	28% (9)	0.014

Se encontró una relación entre una puntuación de fragilidad positiva (mas de 4 rasgos) y un mayor riesgo de complicaciones postoperatorias

CIRUGÍA TORÁCICA Y FRAGILIDAD

Interactive CardioVascular and Thoracic Surgery 18 (2014) 667–670
doi:10.1093/icvts/ivt542 Advance Access publication 27 January 2014

BEST EVIDENCE TOPIC – THORACIC

Frailty assessment in thoracic surgery

Michael John Dunne*, Udo Abah and Marco Scarci

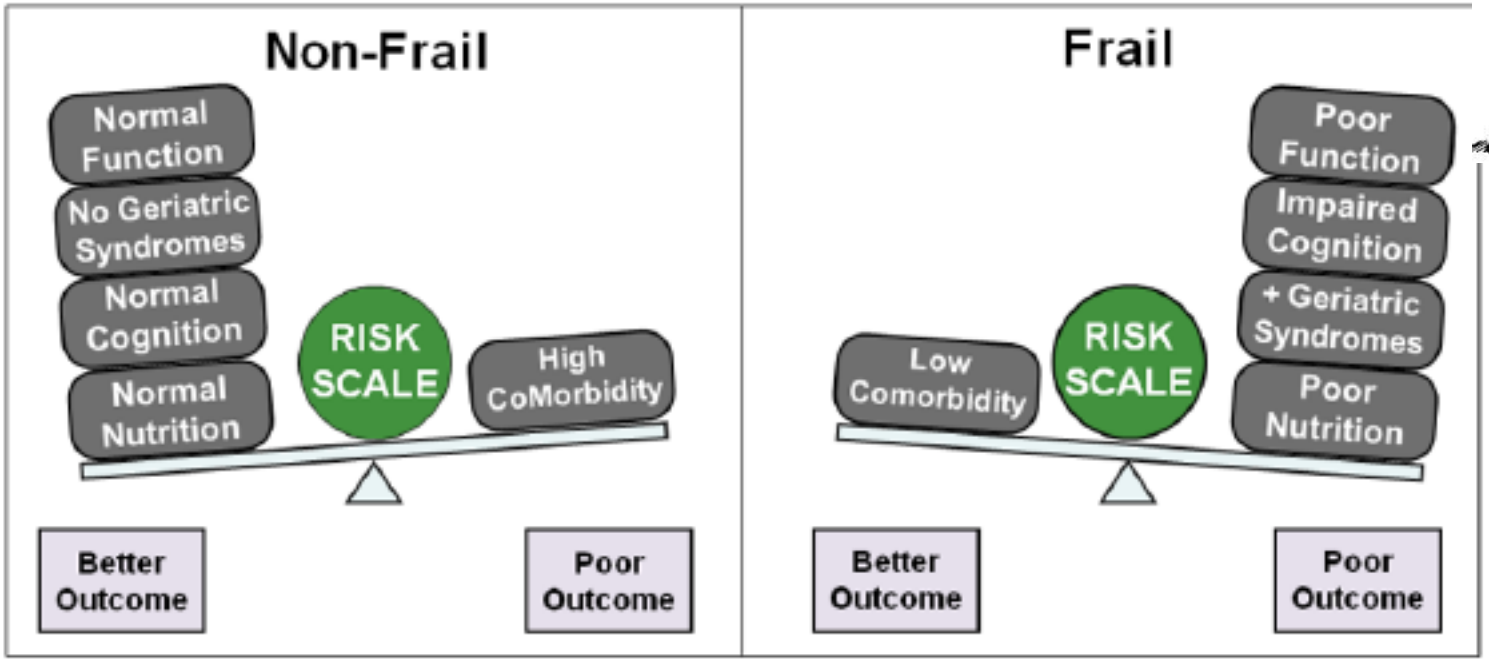
Este estudio aborda la evidencia existente sobre el papel de la fragilidad en la predicción del resultado de los pacientes sometidos a cirugía torácica. **Pocos estudios identificados, y la mayoría retrospectivos.**

Relación entre el aumento de fragilidad y las mayores tasas de complicaciones postoperatorias.

Conclusión: escasez de pruebas para apoyar plenamente o refutar el uso de la puntuación de la fragilidad preoperatoria como un medio fiable de predecir plenamente morbilidad y mortalidad en la cirugía torácica.

Son necesarios estudios de validación.

¿Mayor riesgo perioperatorio?



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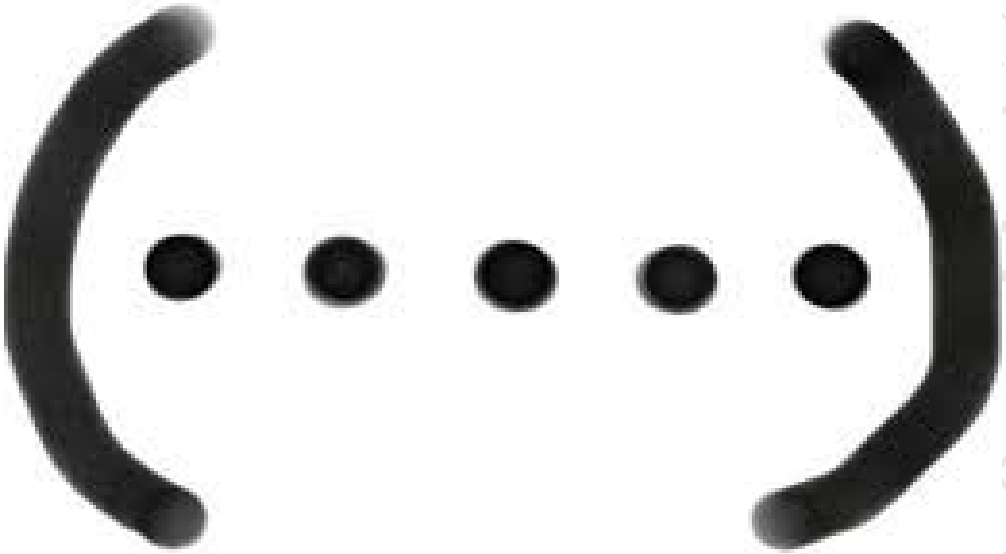

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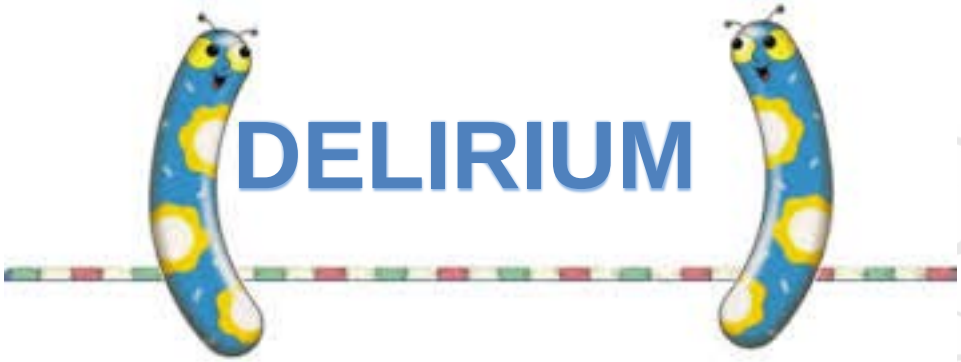

DELIRIUM

- Es una de las complicaciones mas frecuentes en el postoperatorio de pacientes ancianos.
- 10- 60 %.
- Ambos son sindromes geriátricos que se superponen, como similares factores de riesgo (Edad avanzada principalmente) y similares consecuencias (dependencia funcional)
- Diversos estudios han intentado relacionar la fragilidad como factor de riesgo del delirium postoperatorio.

Preoperative Frailty in Older Surgical Patients Is Associated with Early Postoperative Delirium

Jacqueline M. Leung, MD, MPH,* Tiffany L. Tsai, BA,* and Laura P. Sands, PhD†

May 2011 • Volume 112 • Number 5

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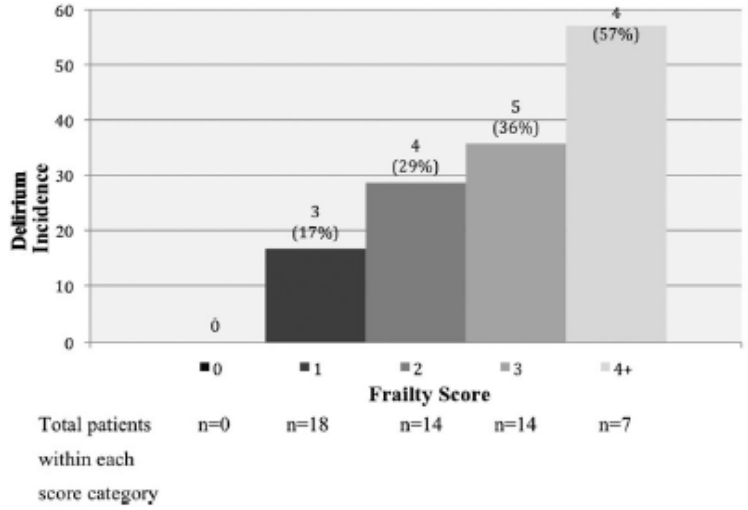

Figure 1. Incidence of postoperative delirium across frailty scores. The incidence of postoperative delirium is shown on the y-axis, and the frailty score is shown on the x-axis. The *n* and % above each bar represent the number and percentage of patients within each frailty score category with delirium.

Mas del 50 % de los pacientes presentaron fragilidad en la valoración preoperatoria

Table 3. Multivariate Logistic Regression of the Predictors of Postoperative Delirium

Variable	β	Odds ratio	95% confidence interval	*P* value
Preoperative depression score	0.35*	1.42	1.06–1.91	0.018
Preoperative frailty score	0.61	1.84	1.07–3.15	0.028

Tanto la depresión preoperatoria como la fragilidad fueron factores independintes para el derlirium postoperatorio.

SARTD-CHGUV Sesión de Formación Continuada
Valencia 3 de Marzo de 2015

La implicación del síndrome de fragilidad, un estado de reserva homeostática disminuido, en la evaluación del riesgo perioperatorio

Objetivos

- Qué es y por qué hablar de ello.
- Cómo se desarrolla y sus implicaciones clínicas.
- Podemos medir la fragilidad: Índices.
- Implicación en la evaluación del riesgo perioperatorio.
- Manejo.
- Conclusiones.

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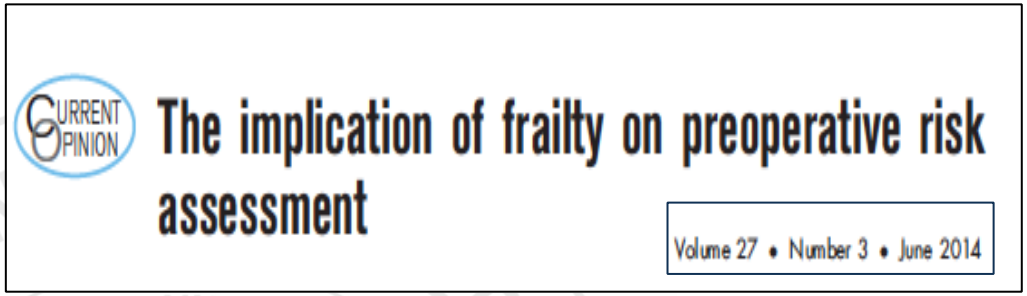
¿Podemos tratar la fragilidad?



- Hasta la fecha, no existen datos ni estudios que hayan investigado cualquier intervención preoperatoria que pueda alterar o revertir el riesgo asociado a los estados de fragilidad en el ámbito quirúrgico.

- Medidas farmacológicas propuestas. Ninguna validada. IECA; testosterona, vitamina D..

- Utilidad de manejo y tratamiento por equipos interdisciplinarios.

Fairhall et al. BMC Medicine 2011, 9:83
http://www.biomedcentral.com/1741-7015/9/83

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Treating frailty-a practical guide

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- La fragilidad **puede ser mitigada.**
- La necesidad de apoyo se **individualizará con cada paciente.**
- Es necesario el **seguimiento e identificar la aparición de eventos agudos.**
- El objetivo es la **mejora del bienestar físico, cognitivio y social** y extender la duración de la independencia de las personas frágiles en la **independencia y la autogestión.**
- La mayoría de los pacientes frágiles deberán ser **alentados y apoyados para adherirse al plan de intervención.**
- Es necesario reconocer las **necesidades de la familia y/o cuidadores.**

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Table 1 Interventions and guidelines to address the common patterns of frailty in the clinical setting

Pattern	Screening and assessment	Intervention (See Additional file 2 for more detailed recommendations)
Unstable health conditions	Medical assessment	Medical management may include geriatrician review, medication review, intervention to increase compliance, referral for follow-up of medical conditions, for example memory clinic, continence clinic. Specific information for common health conditions is provided in Additional file 2.
Under nutrition	Setting appropriate screening, e.g. Mini Nutritional Assessment [48]	Referral to a dietician for nutritional support, which may include: education about foods rich in energy and protein, nutrition advice about general healthy eating and benefits of regular exercise to improve health and overall wellbeing, and nutrition support. The NICE clinical guideline 'Nutrition Support in Adults' provides high quality evidence for oral nutrition support in adults with malnutrition http://guidance.nice.org.uk/CG32 (Chapter 8 in particular).
Psychological factors	Geriatric Depression Scale (short form) [49]	The Victorian Government Health Information toolkit for depression http://www.health.vic.gov.au/older/toolkit/06Cognition/03Depression/index.htm Frail older depressed patients are particularly susceptible to side effects of antidepressant medication [27]. Antidepressant medication should therefore not be used as front line therapy. Antidepressant medication is effective in the treatment of older people [50], and a comparison of treatments is outlined in the Cochrane review by Mottram and colleagues [27]. The NICE clinical guideline 'Occupational therapy interventions and physical activity interventions to promote the mental wellbeing of older people in primary care and residential care', http://guidance.nice.org.uk/PH16
Impaired cognition	Mini Mental Status Examination (MMSE) [51] and/or informant questionnaire (IQ Code) [52]	The NICE clinical guideline, 'Dementia: Supporting people with dementia and their carers in health and social care', http://guidance.nice.org.uk/CG42
Impaired vision/ hearing	Brief clinical assessment	Referral for specialist medical assessment Facilitate liaison with local/national foundation for blindness and low vision, for aids and advice Facilitate self-management of aids for vision/hearing

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Table 1 Interventions and guidelines to address the common patterns of frailty in the clinical setting

Pattern	Screening and assessment	Intervention (See Additional file 2 for more detailed recommendations)
		facilitate self-management or aids for vision/hearing
Decreased mobility	Timed 4 m walk Timed Up and Go Lower limb strength: Timed sit to stand Balance: 4-point balance test Falls risk: Physiological Profile Assessment [53]	Appropriately designed exercise interventions are effective in preventing falls in older people living in both the community [28] and nursing care settings [29]. Exercise should be ongoing, challenge balance and be undertaken at least two hours per week [43]. Home safety interventions reduce falls rate in this high-risk frail group, and multifactorial falls assessment and intervention are also effective [28]. The team should intervene or refer to appropriate disciplines. Strategies to facilitate behavior change to enhance participation in intervention programs are outlined in the NICE Guidance 'The most appropriate means of generic and specific interventions to support attitude and behaviour change at population and community levels', http://www.nice.org.uk/PH6[33]. We also encourage the implementation of the Recommendations on physical activity for health for older Australians http://www.health.gov.au/internet/main/publishing.nsf/Content/phd-physical-rec-older-guidelines[54].
Lack of participation in life roles	Clinical assessment	Barriers to participation should be assessed. Randomized controlled trials have demonstrated increased participation with intervention targeting risk factors, such as modification of the home environment [30] and specific training of community interactions [31]. Setting individualised goals and tailoring interventions to meet these goals may also be effective. Enlist help of significant others/carers to encourage goal attainment.
Problems with services or support systems	Clinical assessment	There should be early and ongoing engagement with support and education of formal and informal carers [25]. Caregivers and family should be taught about frailty, interventions to optimize function, and be involved in planning and development of management plans. Provision and co-ordination of services, with preference given to packages of care, followed by single services, followed by a residential aged care facility. The case co-ordinator must ensure the frail individual and their family/carers understand the services provided and how to promptly access greater assistance in times of increased need. Advice for assisting carers is provided in the NICE clinical guideline 'Dementia: Supporting people with dementia and their carers in health and social care' http://guidance.nice.org.uk/CG42, Section 1.11.

SARTD-CHGUV Sesión de Formación Continuada
Valencia 3 de Marzo de 2015

La implicación del síndrome de fragilidad, un estado de reserva homeostática disminuido, en la evaluación del riesgo perioperatorio

Objetivos

- Qué es y por qué hablar de ello.
- Cómo se desarrolla y sus implicaciones clínicas.
- Podemos medir la fragilidad: Índices.
- Implicación en la evaluación del riesgo perioperatorio.
- Manejo.
- Conclusiones.

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Conclusiones

- La **fragilidad, nuevo factor independiente predictor de complicaciones postoperatorias, institucionalización y muerte**.
- La **valoración rutinaria preoperatoria** de la fragilidad puede ayudar a la **selección de pacientes con mayor riesgo de complicaciones postoperatorias**, pudiendo guiar la toma de decisiones clínicas.
- Son necesarios **estudios de validación de los métodos de valoración de la fragilidad**.
- Falta de homogeneidad en el diagnóstico en los diferentes estudios, así como **falta de estudios prospectivos.**
- Necesidad de **abordaje multidisciplinario.**

Conclusiones

- **No existe una definición universal** de fragilidad.
- Sin embargo, la **fragilidad se puede manifestar por un número reconocible de patrones que pueden ser útiles para guiar evaluaciones e intervenciones** determinadas sobre nuestros pacientes ya desde el **preoperatorio.**
- Se recomienda una **evaluación integral** en las personas mayores para aproximar el diagnóstico de fragilidad:
  - **Evaluación del bienestar físico,**
  - **Evaluación del bienestar emocional y**
  - **Evaluación del bienestar psicológico.**