Clinical Decision Making in Vascular Surgery When Caring for Frail and Vulnerable Adults: Is it Ethical to Not Offer Them an Operation?

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DISCLOSURE

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• No relevant financial relationship reported
Is it ethical to not offer Mr. Jones an operation?
Principles of Biomedical Ethics

For medical decision making to be considered “ethical”, it must respect all four of these principles:

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   - Patients should be treated equally and fairly
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4. Respect for Autonomy
   - Patients have the right to make choices
Pre-operative Evaluation of Vulnerability

- Functional Decline
- Limited Mobility
- Depressed Cognition
- Poor Nutrition
- Multi-Morbidity
Pre-operative Evaluation of Vulnerability

✓ Functional Decline
✓ Limited Mobility
✓ Depressed Cognition
✓ Poor Nutrition
✓ Multi-Morbidity

Frailty
Frailty = Multifactorial Syndrome

Diagram showing the relationship between various factors leading to frailty, including:
- Neuroendocrine Dysregulation
- Anorexia of aging
- Chronic Undernutrition (Inadequate intake of protein and energy; micronutrient deficiencies)
- Aging: Senescent musculoskeletal changes
- Negative Energy Balance
- Negative Nitrogen Balance
- Weight Loss
- Loss of muscle mass
- Sarcopenia
- Disease
- Total Energy Expenditure
- Activity
- Walking Speed
- Disability
- Dependency
- Resting Metabolic Rate
- Strength & Power
- $\dot{V}O_{2,max}$
Frailty = Multifactorial Syndrome
# Comprehensive Geriatric Assessment (CGA)

## Canadian Study of Health & Aging

<table>
<thead>
<tr>
<th>Changes in everyday activities</th>
<th>Mood problems</th>
<th>Seizures, partial complex</th>
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</thead>
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<tr>
<td>Head and neck problems</td>
<td>Feeling sad, blue, depressed</td>
<td>Seizures, generalized</td>
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<tr>
<td>Poor muscle tone in neck</td>
<td>History of depressed mood</td>
<td>Syncope or blackouts</td>
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<tr>
<td>Bradykinesia, facial</td>
<td>Tiredness all the time</td>
<td>Headache</td>
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<td>Problems getting dressed</td>
<td>Depression (clinical impression)</td>
<td>Cerebrovascular problems</td>
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<td>Problems with bathing</td>
<td>Sleep changes</td>
<td>History of stroke</td>
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<tr>
<td>Problems carrying out personal grooming</td>
<td>Memory changes</td>
<td>History of diabetes mellitus</td>
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<tr>
<td>Urinary incontinence</td>
<td>Short-term memory impairment</td>
<td>Arterial hypertension</td>
</tr>
<tr>
<td>Toileting problems</td>
<td>Long-term memory impairment</td>
<td>Peripheral pulses</td>
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<tr>
<td>Bulk difficulties</td>
<td>Changes in general mental functioning</td>
<td>Cardiac problems</td>
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<td>Rectal problems</td>
<td>Onset of cognitive symptoms</td>
<td>Myocardial infarction</td>
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<td>Gastrointestinal problems</td>
<td>Clouding or delirium</td>
<td>Arrhythmia</td>
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<tr>
<td>Problems cooking</td>
<td>Paranoid features</td>
<td>Congestive heart failure</td>
</tr>
<tr>
<td>Sucking problems</td>
<td>History relevant to cognitive impairment or loss</td>
<td>Lung problems</td>
</tr>
<tr>
<td>Problems going out alone</td>
<td>Family history relevant to cognitive impairment/loss</td>
<td>Respiratory problems</td>
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<tr>
<td>Impaired mobility</td>
<td>Impaired vibration</td>
<td>History of thyroid disease</td>
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<tr>
<td>Musculoskeletal problems</td>
<td>Tremor at rest</td>
<td>Thyroid problems</td>
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<tr>
<td>Bradykinesia of the limbs</td>
<td>Postural tremor</td>
<td>Skin problems</td>
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<tr>
<td>Poor muscle tone in limbs</td>
<td>Intention tremor</td>
<td>Malignant disease</td>
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<tr>
<td>Poor limb coordination</td>
<td>History of Parkinson disease</td>
<td>Breast problems</td>
</tr>
<tr>
<td>Poor coordination, trunk</td>
<td>Family history of degenerative disease</td>
<td>Abdominal problems</td>
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<tr>
<td>Poor standing posture</td>
<td>Presence of palpomentral reflex</td>
<td>Presence of snout reflex</td>
</tr>
<tr>
<td>Irregular gait pattern</td>
<td></td>
<td>Falls</td>
</tr>
</tbody>
</table>

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Accumulated Deficits Model of Frailty
CGA Frailty Index

- CGA Frailty Index (FI) = the number of positive responses (numerator) divided by the total number of items assessed (denominator).

- CGA FI is a better predictor of 70-month survival than age alone.

Clinical Frailty Scale (CFS)

1. Very Fit – People who are robust, active, energetic and motivated. These people commonly exercise regularly. They are among the fittest for their age.

2. Well – People who have no active disease symptoms but are less fit than category 1. Often, they exercise or are very active occasionally, e.g., seasonally.

3. Managing Well – People whose medical problems are well controlled, but are not regularly active beyond routine walking.

4. Vulnerable – While not dependent on others for daily help, often symptoms limit activities. A common complaint is being “slowly up,” and/or being tired during the day.

5. Mildly Frail – These people often have more evident slowing, and need help in high order IADLs (finances, transportation, heavy housework, medications). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation and housework.

6. Moderately Frail – People need help with all outside activities and with keeping house. Insist, they often have problems with stairs and need help with bathing and might need minimal assistance (cuing, standing) with dressing.

7. Severely Frail – Completely dependent for personal care, from whatever cause (physical or cognitive). Even so, they seem stable and not at high risk of dying (within ~6 months).

8. Very Severely Frail – Completely dependent, approaching the end of life. Typically, they could not recover even from a minor illness.

9. Terminally Ill – Approaching the end of life. This category applies to people with a life expectancy <6 months, who are not otherwise evidently frail.

Source: Rockwood K. et al. CMAJ 2005;173:489-495
The Clinical Frailty Scale was validated against the CGA-FI for measuring frailty among community-living older adults (Rockwood, et al. *CMAJ* 2005).
Cohort of Frail Vascular Surgery Patients

**2,355** patients with CFS scores in Vascular Surgery clinic, January 2016 to August 2017

Vascular Quality Initiative (VQI) REGISTRY DATABASE

**245** patients underwent major vascular procedures including CEA, EVAR, open AAA, PVI, TEVAR, Suprainguinal & Intrainguinal Bypass

**134** independent-living patients with pre-op frailty assessment

**39 Frail Patients (CFS ≥ 5)**

**95 Non-Frail Patients**

**111 patients excluded**
- LOS < 24 hrs (n=39)
- Pre-operative non-home residence (n=4)
- Urgent/emergent surgery (n=68)
30-Day Outcomes Among Frail Patients

- **Non-home Discharge**: Frail patients have a significantly higher percentage compared to non-frail patients.
- **Need for Mobility Assistance**: Frail patients also have a significantly higher percentage.
- **30-day Mortality**: Frail patients have a significantly higher mortality rate.
- **30-day Readmission**: Frail patients have a significantly higher readmission rate.

*P<0.05 for comparison between frail vs. non-frail patients.
2-Year Survival Following Vascular Surgery

Kaplan-Meier survival estimates for non-frail and frail patients over a follow-up time of 3 years. The frail group (CFS ≥ 5) has a significantly lower survival rate compared to the non-frail group.
Achieving Beneficence and Non-Maleficence

Intervention

Beneficence & Non-Maleficence

No-Intervention

Poor Surgical Outcomes

Harm From Disease
Estimating Surgical Risk for Vulnerable Patients

Estimating Surgical Risk for Vulnerable Patients

Estimating Surgical Risk for Vulnerable Patients

Predisposing Factors/Vulnerability

Precipitating Factors/Insults

High Vulnerability

Low Vulnerability

Major Operation

Minor Operation

High Risk

Low Risk

SURGICAL RISK

Respecting Autonomy with Vulnerable Patients

*Best Case / Worst Case Framework*

**Best case:**
- Long surgery
- ICU, 3-5 days
- Hospital, 1-2 weeks
- Nursing home

**Best case:**
- Time to say goodbye to family
- Pain controlled
- Death at home

**Most likely:**
- ICU, 1-2 weeks
- Long-term dialysis
- Death, 2-3 months

**Most likely:**
- Groggy, unable to talk to family
- Death in hospital

**Worst case:**
- Complications after surgery
- Death in ICU, unable to talk to family

**Worst case:**
- Death in hospital before family has time to gather

Ethical principles should be applied to all surgical and non-operative options offered to Mr. Jones:

- Justice
- Beneficence
- Non-maleficence
- Autonomy
Summary

• Balancing potential harms and benefits of surgical vs. non-operative options in frail patients is challenging.

• A principles-based approach to clinical decision making for frail patients can be used to help navigate ethical dilemmas, identify patient values, and select the best options for each patient.
Thank You

Questions or Comments? Benjamin.Brooke@hsc.utah.edu