

Supplementary figure S1:

The FRAIL scale

Fatigue: How much of the time during the past 4 weeks did you feel tired?

1 = All of the time, 2 = Most of the time, 3 = Some of the time, 4 = A little of the time, 5 = None of the time. Responses of “1” or “2” are scored as 1 and all others as 0.

Score _____

Resistance: By yourself and not using aids, do you have any difficulty

walking up 10 steps without resting?

1 = Yes, 0 = No.

Score _____

Ambulation: By yourself and not using aids, do you have any difficulty

walking a couple of blocks (e.g., several hundred yards)?

1 = Yes, 0 = No.

Score _____

Illnesses: Did a doctor ever tell you that you have [illness]?

How many (see list below): _____ The total illnesses (0–11) are recoded as 0–4 = 0 and 5–11 = 1. The illnesses include hypertension, diabetes, cancer (other than a minor skin cancer), chronic lung disease, heart attack, congestive heart failure, angina, asthma, arthritis, stroke, and kidney disease.

Score _____

Loss of weight: How much do you weigh? _____ [current weight]

One year ago, how much did you weigh? _____ [weight 1 year ago]

Percent weight change is computed as: $[(\text{weight 1 year ago} - \text{current weight}) / \text{weight 1 year ago}] * 100$. Percent change > 5 (representing a 5% loss of weight) is scored as 1 and $< 5\%$ as 0.

Score _____

Total Score: _____

A score of 0 represents robust health status 1-2: Pre-frail 3-5: Frail

Supplementary file 2:

Univariate and multivariate logistic regression analyses of prolonged total hospital stay

Variable	Single factor analysis		Multifactor analysis	
	OR(95%CI)	P value	OR(95%CI)	P value
Age	1.047 (0.977-1.122)	0.195		
Male	1.200 (0.646-2.228)	0.564		
BMI	1.043 (0.935-1.164)	0.448		
Frailty				
Pre-frail vs healthy	4.615 (1.037-20.534)	0.045	3.577 (0.761-16.824)	0.107
Frail vs healthy	9.758 (2.113-45.069)	0.004	4.219 (0.775-22.961)	0.096
Albumin levels	0.853 (0.770-0.944)	0.002	0.893 (0.796-1.002)	0.054
ASA $\geq$ Grade 3	3.308 (1.746-6.268)	<0.001	2.214 (1.046-4.685)	0.038
BADL $\leq$ 60 points	2.443 (1.220-4.892)	0.012	1.422 (0.621-3.255)	0.404
Operating time	1.007 (1.003-1.011)	0.002	1.007 (0.999-1.014)	0.069
More invasive procedures	1.515 (0.540-4.255)	0.430		
Liquid intake	1.000 (1.000-1.001)	0.009	1.000 (1.000-1.001)	0.793
Blood loss	1.001 (1.000-1.001)	0.037	1.000 (0.999-1.001)	0.988
Urine output	1.002 (1.000-1.004)	0.067		
Transfusion of blood	1.765 (0.754-4.132)	0.191		

Note: Bolded p-values indicate statistically significant differences.

Sample size calculated as complication rates in the healthy and pre-frailty groups, with at least 73 cases in each group.

Calculator

What confidence level do you need? Typical choices are 90%, 95% or 99%	95 %	☐
What power do you need? A common choice is 80%	90 %	☐
What do you believe the likely sample proportion in group 1 to be?	10.42 %	☐
What do you believe the likely sample proportion in group 2 to be?	31.62 %	☐
Your recommended sample size is		73

Sample size calculated as complication rates in the healthy and frailty groups, with at least 27 cases in each group.

Calculator

What confidence level do you need? Typical choices are 90%, 95% or 99%	95 %	☐
What power do you need? A common choice is 80%	90 %	☐
What do you believe the likely sample proportion in group 1 to be?	10.42 %	☐
What do you believe the likely sample proportion in group 2 to be?	47.17 %	☐
Your recommended sample size is		27

Total sample size is at least 173 cases: $73+73+27=173$

Taking into account a 15 % dropout rate, the total sample size was calculated to be 204.

As follows: $173 / (1-15\%) = 203.529$

Complication Description:

Complications of interest included pulmonary infection, urinary tract infection, surgical incision infection, cardiovascular system complications, electrolyte disturbances, postoperative blood transfusion, and postoperative feeding difficulties. Complications of interest included pulmonary infection, urinary tract infection, surgical incision infection, cardiovascular system complications, electrolyte disturbances, postoperative blood transfusion, and postoperative feeding difficulties.

1. Pulmonary infection: Pneumonia occurring in a surgical patient within 30d postoperatively, see Diagnosis of Pneumonia.

2. urinary tract infection: Diagnostic criteria for postoperative urinary tract infection are based on international guidelines and consensus, incorporating clinical presentation, laboratory tests, and imaging evidence.

3. surgical incision infection

4. cardiovascular system complications include heart failure, arrhythmias, myocardial infarction, dramatic fluctuations in blood pressure, and perioperative myocardial injury.

5. Electrolyte disturbances are postoperative imbalances of potassium, sodium and calcium ions. The normal value of serum sodium concentration should be between 135 mmol/L and 145 mmol/L; too high or too low is considered abnormal. The normal range of blood potassium is 3.5~5.5mmol/L. The normal range of serum calcium ion concentration is 2.25-2.58mmol/L.

6. Postoperative severe anaemia, Hb<70g/dL

7. Postoperative gastrointestinal dysfunction refers to patients who are unable to eat normally due to impaired recovery of gastrointestinal function. It may be manifested as nausea, vomiting, abdominal distension, delayed defecation or bowel movement, intestinal obstruction, gastrointestinal bleeding, and may even cause intestinal infection.

BADL Assessment:

ADL Programme	Self-care	Slightly dependent	Greater Dependence	Full Dependency
Eating	10	5	0	0
Bathing	5	0	0	0
Grooming	5	0	0	0
Dressing	10	5	0	0
Bowel Control	10	5	0	0
Controlling urination	10	5	0	0
Going to the toilet	10	5	0	0
Bed and chair transfer	15	10	5	0
Walking	15	10	5	0
Walking up and down stairs	10	5	0	0

100 points Good ability to perform daily activities without dependence on others
 Greater than 60 points, rated as good, indicating mild functional impairment, but basic daily life is basically self-care

A score of 60-41 indicates moderate dysfunction, requiring some assistance in daily life.

A score of 40-21 indicates severe functional impairment, with obvious need to rely on others in daily life.

<A score of <20 indicates total disability and total dependence on others in daily life.

PS: Treatment benefits for patients with >40 points.

No. Item Description of assessment

1 Eating Delivering food from a container to the mouth with suitable utensils.

Including the process of taking food with chopsticks (spoon or fork), holding the bowl (plate), chewing and swallowing.

10 points: can eat independently. 5 points: requires partial assistance. 0 points: needs great help or is totally dependent on others, or has an indwelling gastric tube.

2 Bathing 5 points: can complete the bathing process independently by himself/herself after preparing the bath water. 0 points: needs help from others during the bathing process.

3 Grooming Includes washing face, brushing teeth, combing hair, shaving, etc.

5 points: can complete the process independently by themselves. 0 points: needs help from others.

4 Dressing Includes putting on/taking off clothes, fastening buttons, zipping, putting

on/taking off shoes and socks, and tying shoelaces.

10 points: can be done independently. 5 points: needs partial help. 0 points: needs great help or is totally dependent on others.

5 Control

Bowel movements 10 points: can control bowel movements. 5 points: occasional loss of control, or needs prompting by others. 0 points: no control at all.

6 Control

Urination 10 points: can control urination. 5 points: occasional loss of control, or requires prompting. 0 points: complete loss of control, or indwelling urinary catheter.

7 Toileting Includes going to the toilet, undressing, wiping, tidying up and flushing.

10 points: can be done independently. 5 points: requires partial assistance. 0 points: needs great help or is totally dependent on others.

8 Bed and chair

Transfers 15 points: can be done independently. 10 points: requires partial assistance. 5 points: needs a lot of help. 0 points: totally dependent on others.

9 Walking on a level surface

Walking 15 points: can walk 45 metres independently on a flat surface. 10 points: needs partial help. 5 points: needs great help. 0 points: totally dependent on others.

10 Going up and down

Stairs 10 points: can go up and down stairs independently. 5 points: needs partial help. 0 points: needs great help or is totally dependent on others.