Supplementary Online Content


eTable 1. Definition of comorbidities (ICD-10)
eTable 2. Adjusted analyses restricted to patients younger than 60 years of age who were residing at home before surgery
eTable 3. Adjusted analyses that did and did not include hospital length of stay (LOS) as a covariate

This supplementary material has been provided by the authors to give readers additional information about their work.
**Table 1: Definition of comorbidities (ICD-10)**

**A - CARDIOVASCULAR :**

1. **ISCHEMIC HEART DISEASE**  
   I20.x - Angina pectoris  
   I25.x - Chronic ischemic heart disease  
   Z95.5 - Presence of coronary angioplasty implant and graft

2. **CARDIAC, ARRYTHMIA OR HEART BLOCKS**  
   I44.1 - Atrioventricular block, second degree  
   I44.2 - Atrioventricular block, complete  
   I44.3 - Other and unspecified atrioventricular block  
   I45.6 - Pre-excitation syndrome  
   I45.9 - Conduction disorder, unspecified  
   I47.x - Paroxysmal tachycardia  
   I49.x - Other cardiac arrhythmias  
   R00.0 - Tachycardia, unspecified  
   R00.1 - Bradycardia, unspecified  
   R00.8 - Other and unspecified abnormalities of heart beat  
   Z95.0 - Tachycardia, unspecified

3. **ATRIAL FIBRILLATION**  
   I48.x - Atrial fibrillation and flutter

4. **CHRONIC HEART FAILURE or CARDIOMYOPATHY**  
   I11.0 - Hypertensive heart disease with (congestive) heart failure  
   I13.0 - Hypertensive heart and renal disease with (congestive) heart failure  
   I13.2 - Hypertensive heart and renal disease with both (congestive) heart failure and renal failure  
   I42.0 - Dilated cardiomyopathy  
   I42.5 - Other restrictive cardiomyopathy, Constrictive cardiomyopathy.  
   I42.6 - Alcoholic cardiomyopathy  
   I42.7 - Cardiomyopathy due to drugs and other external agents  
   I42.8 - Other cardiomyopathies  
   I42.9 - Cardiomyopathy, unspecified; Cardiomyopathy.  
   I43.x - Cardiomyopathy in diseases classified elsewhere

5. **VALVULAR DISEASE**  
   I05.x - Rheumatic mitral valve diseases  
   I06.x - Rheumatic aortic valve diseases  
   I07.x - Rheumatic tricuspid valve diseases  
   I08.x - Multiple valve diseases  
   I34.x - Nonrheumatic mitral valve disorders  
   I35.x - Nonrheumatic aortic valve disorders  
   I36.x - Nonrheumatic tricuspid valve disorders  
   I37.x - Pulmonary valve disorders  
   I38.x - Endocarditis, valve unspecified  
   I39.x - Endocarditis and heart valve disorders in diseases classified elsewhere  
   Q23.0 - Congenital stenosis of aortic valve  
   Q23.1 - Congenital insufficiency of aortic valve  
   Q23.2 - Congenital mitral stenosis  
   Q23.3 - Congenital mitral insufficiency  
   Z95.2 - Presence of prosthetic heart valve  
   Z95.3 - Presence of xenogenic heart valve  
   Z95.4 - Presence of other heart-valve replacement

6. **PERIPHERAL VASCULAR DISEASE or ABDOMINAL AORTIC ANEURYSM**  
   I70.x - Atherosclerosis  
   I70.1 - Thoracic aortic aneurysm, without mention of rupture  
   I70.4 - Abdominal aortic aneurysm, without mention of rupture  
   I70.6 - Thoracoabdominal aortic aneurysm, without mention of rupture  
   I70.9 - Aortic aneurysm of unspecified site, without mention of rupture  
   I73.1 - Thromboangiitis obliterans [Buerger]  
   I73.8 - Other specified peripheral vascular diseases  
   I73.9 - Peripheral vascular disease, unspecified
I79.0 - Disorders of arteries, arterioles and capillaries in diseases classified elsewhere
K55.1 - Chronic vascular disorders of intestine
K55.8 - Other vascular disorders of intestine, unspecified
K55.9 - Vascular disorder of intestine, unspecified
Z95.8 - Presence of other cardiac and vascular implants and grafts
Z95.9 - Presence of cardiac and vascular implant and graft, unspecified

7 - HYPERTENSION
I10.x - Essential (primary) hypertension
I11.x - Hypertensive heart disease
I12.x - Hypertensive renal disease
I13.x - Hypertensive heart and renal disease
I15.x - Secondary hypertension

B - NEUROLOGIC HISTORY:

8 - PSYCHOSES
F20.x - Schizophrenia
F22.x - Persistent delusional disorders
F23.x - Acute and transient psychotic disorders
F24.x - Induced delusional disorder
F25.x - Schizoaffective disorders
F28.x - Other nonorganic psychotic disorders
F29.x - Unspecified nonorganic psychosis
F30.2 - Mania with psychotic symptoms
F31.2 - Bipolar affective disorder, current episode manic with psychotic symptoms
F31.5 - Bipolar affective disorder, current episode severe depression with psychotic symptoms

9 - DEPRESSION
F20.4 - Post-schizophrenic depression
F31.3 - Bipolar affective disorder, current episode mild or moderate depression
F31.4 - Bipolar affective disorder, current episode severe depression without psychotic symptoms
F31.5 - Bipolar affective disorder, current episode severe depression with psychotic symptoms
F32.x - Depressive episode
F33.x - Recurrent depressive disorder
F34.1 - Dysthymia
F41.2 - Mixed anxiety and depressive disorder
F43.2 - Adjustment disorders

10 - DEMENTIA
F00.x - Dementia in Alzheimer disease
F01.x - Vascular dementia
F02.x - Dementia in other diseases classified elsewhere
F03.x - Unspecified dementia
G30.x - Alzheimer disease with early onset
G31.x - Other degenerative diseases of nervous system, not elsewhere classified

11 - CEREBROVASCULAR DISEASE
G45.x - Transient cerebral ischaemic attacks and related syndromes
G46.x - Vascular syndromes of brain in cerebrovascular diseases
I69.x - Sequelae of cerebrovascular disease

12 – HEMIPLEGIA, PARAPLEGIA OR PARALYTIC SYNDROME
G04.1 - Tropical spastic paraplegia
G11.4 - Hereditary spastic paraplegia
G80.1 - Spastic diplegic cerebral palsy
G80.2 - Spastic hemiplegic cerebral palsy
G81.x - Hemiplegia
G82.x - Paraplegia and tetraplegia
G83.0 - Diplegia of upper limbs
G83.1 - Monoplegia of lower limb
G83.2 - Monoplegia of upper limb
G83.3 - Monoplegia, unspecified
G83.4 - Cauda equina syndrome
G83.9 - Paralytic syndrome, unspecified

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C - RESPIRATORY HISTORY

13 - CHRONIC OBSTRUCTIVE PULMONARY DISEASE
 J43.x - Emphysema
 J44.x - Other chronic obstructive pulmonary disease

14 - PULMONARY CIRCULATION DISORDERS
 I27.x - Primary pulmonary hypertension
 I28.8 - Other specified diseases of pulmonary vessels
 I28.9 - Disease of pulmonary vessels, unspecified

15 - CHRONIC RESPIRATORY FAILURE
 J96.1 - Chronic respiratory failure

D - OTHERS

16 – CHRONIC ALCOHOL ABUSES
 F10 - Mental and behavioural disorders due to use of alcohol
 E52 - Niacin deficiency [pellagra]
 G62.1 - Alcoholic polyneuropathy
 I42.6 - Alcoholic cardiomyopathy
 K29.2 - Alcoholic gastritis
 K70.x - Alcoholic liver disease
 T51.x - Toxic effect of alcohol
 Z50.2 - Alcohol rehabilitation
 Z71.4 - Alcohol abuse counselling and surveillance
 Z72.1 - Alcohol use

17 – CANCER: ANY MALIGNANCY, INCLUDING LYMPHOMA AND LEUKEMIA.
 C00.x to C75.x - Malignant neoplasms, stated or presumed to be primary, of specified sites, except of lymphoid, hematopoietic and related tissue
 C76.x - Malignant neoplasm of other and ill-defined sites
 C80.x - Malignant neoplasm, without specification of site
 C81.x to C96.x - Malignant neoplasms, stated or presumed to be primary, of lymphoid, hematopoietic and related tissue
 C97.x - Malignant neoplasms of independent (primary) multiple sites
 Z85.x - Personal history of malignant neoplasm
 Z86.0 - Personal history of other neoplasms

18 - DEFICIENCY ANEMIA
 D50.x - Iron deficiency anemia
 D51.x - Vitamin B12 deficiency anemia
 D52.x - Folate deficiency anemia
 D53.x - Other nutritional anemia.

19 - DIABETES
 E10.0 to E10.9 - Insulin-dependent diabetes mellitus
 E11.0 to E11.9 - Non-insulin-dependent diabetes mellitus
 E12.0 to E12.9 - Malnutrition-related diabetes mellitus
 E13.0 to E13.9 - Other specified diabetes mellitus
 E14.0 to E14.9 - Unspecified diabetes mellitus

20 - DRUG ABUSES
 F11.x - Mental and behavioural disorders due to use of opioids
 F12.x - Mental and behavioural disorders due to use of cannabinoids
 F13.x - Mental and behavioural disorders due to use of sedatives or hypnotics
 F14.x - Mental and behavioural disorders due to use of cocaine
 F15.x - Mental and behavioural disorders due to use of other stimulants, including caffeine
 F16.x - Mental and behavioural disorders due to use of hallucinogens
 F18.x - Mental and behavioural disorders due to use of volatile solvents
 F19.x - Mental and behavioural disorders due to multiple drug use and use of other psychoactive substances
 Z71.5 - Drug abuse counselling and surveillance
 Z72.2 - Drug use

21 - TRANSPLANTED ORGAN
 Z94.0 - Kidney transplant status
 Z94.1 - Heart transplant status
Z94.2 - Lung transplant status  
Z94.3 - Heart and lungs transplant status  
Z94.4 - Liver transplant status

22 - LIVER DISEASE
B18.x - Chronic viral hepatitis  
I85.x - Esophageal varices  
I86.4 - Gastric varices  
I98.2 - Esophageal varices without bleeding in diseases classified elsewhere  
K70.x - Alcoholic liver disease  
K71.1 - Toxic liver disease with hepatic necrosis  
K71.3 - Toxic liver disease with chronic persistent hepatitis  
K71.4 - Toxic liver disease with chronic lobular hepatitis  
K71.5 - Toxic liver disease with chronic active hepatitis  
K71.7 - Toxic liver disease with fibrosis and cirrhosis of liver  
K72.x - Hepatic failure, not elsewhere classified  
K73.x - Chronic hepatitis, not elsewhere classified  
K74.x - Fibrosis and cirrhosis of liver  
K76.x - Other diseases of liver  
Z94.4 - Liver transplant status

23 - METASTATIC SOLID TUMOR
C77.x - Secondary and unspecified malignant neoplasm of lymph nodes  
C78.x - Secondary malignant neoplasm of respiratory and digestive organs  
C79.x - Secondary malignant neoplasm of other and unspecified sites

24 - OBESITY
E66.x - Obesity due to excess calories

25 - PREADMISSION DIALYSIS
Z99.2 - Dependence on renal dialysis  
Z49.1 - Extracorporeal dialysis  
Z49.2 - Other dialysis

26 - RENAL FAILURE
I12.0 - Hypertensive renal disease with renal failure  
I13.1 - Hypertensive heart and renal disease with (congestive) heart failure  
N18.1 - Chronic kidney disease, stage 1  
N18.2 - Chronic kidney disease, stage 2  
N18.3 - Chronic kidney disease, stage 3  
N18.4 - Chronic kidney disease, stage 4  
N18.5 - Chronic kidney disease, stage 5  
N18.9 - Chronic kidney disease, unspecified  
N19.x - Unspecified kidney failure

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**eTable 2: Adjusted analyses restricted to patients younger than 60 years of age who were residing at home before surgery.**

<table>
<thead>
<tr>
<th></th>
<th>THR group</th>
<th>Hip Fracture group</th>
<th>RR</th>
<th>RR 95% CI</th>
<th>P Value</th>
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<tbody>
<tr>
<td></td>
<td>N= 12683</td>
<td>N= 12683</td>
<td></td>
<td>Lower</td>
<td>Higher</td>
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<tr>
<td>In hospital mortality (%)</td>
<td>10 (0.08)</td>
<td>58 (0.46)</td>
<td>5.8</td>
<td>2.96</td>
<td>11.35</td>
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<tr>
<td>Postoperative myocardial infarction (%)</td>
<td>6 (0.05)</td>
<td>8 (0.06)</td>
<td>1.3</td>
<td>0.46</td>
<td>3.84</td>
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<td>Postoperative heart failure (%)</td>
<td>33 (0.26)</td>
<td>42 (0.33)</td>
<td>1.2</td>
<td>0.81</td>
<td>2.01</td>
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<tr>
<td>Postoperative stroke (%)</td>
<td>2 (0.04)</td>
<td>25 (0.20)</td>
<td>5.0</td>
<td>1.91</td>
<td>13.05</td>
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<td>Postoperative renal failure (%)</td>
<td>8 (0.06)</td>
<td>46 (0.36)</td>
<td>5.7</td>
<td>2.71</td>
<td>12.18</td>
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<tr>
<td>Postoperative sepsis (%)</td>
<td>8 (0.06)</td>
<td>49 (0.39)</td>
<td>6.1</td>
<td>2.90</td>
<td>12.93</td>
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<tr>
<td>Any postoperative complication (%)</td>
<td>81 (0.64)</td>
<td>303 (2.39)</td>
<td>3.7</td>
<td>2.93</td>
<td>4.78</td>
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<tr>
<td>ICU admission (%)</td>
<td>15 (0.12)</td>
<td>378 (2.98)</td>
<td>25.00</td>
<td>15.04</td>
<td>42.21</td>
</tr>
</tbody>
</table>

ICU: intensive care unit; RR: Relative Risk; CI: confidence interval.
**eTable 3:** Adjusted analyses that did and did not include hospital length of stay (LOS) as a covariate

<table>
<thead>
<tr>
<th>THR group</th>
<th>Hip Fracture group</th>
<th>Not adjusted for LOS</th>
<th>LOS adjusted</th>
</tr>
</thead>
<tbody>
<tr>
<td>N= 117157</td>
<td>N= 117157</td>
<td>RR 95% CI</td>
<td>RR 95% CI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lower</td>
<td>Higher</td>
</tr>
<tr>
<td>In hospital mortality (%)</td>
<td>363 (0.31)</td>
<td>2132 (1.82)</td>
<td>5.8</td>
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<tr>
<td>Postoperative myocardial infarction (%)</td>
<td>258 (0.22)</td>
<td>422 (0.36)</td>
<td>1.6</td>
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<tr>
<td>Postoperative heart failure (%)</td>
<td>1371 (1.17)</td>
<td>3116 (2.66)</td>
<td>2.2</td>
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<tr>
<td>Postoperative stroke (%)</td>
<td>176 (0.15)</td>
<td>457 (0.39)</td>
<td>2.7</td>
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<td>Postoperative renal failure (%)</td>
<td>351 (0.30)</td>
<td>762 (0.65)</td>
<td>2.2</td>
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<tr>
<td>Postoperative sepsis (%)</td>
<td>105 (0.09)</td>
<td>316 (0.27)</td>
<td>3.1</td>
</tr>
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<td>Any postoperative complication (%)</td>
<td>2741 (2.34)</td>
<td>6889 (5.88)</td>
<td>2.5</td>
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<tr>
<td>ICU admission (%)</td>
<td>433 (0.37)</td>
<td>1501 (1.28)</td>
<td>3.4</td>
</tr>
</tbody>
</table>

ICU: intensive care unit; RR: Relative Risk; CI: confidence interval.