Peri-Operative Mortality, Complications, and Healthcare Usage Associated with Endovascular Coiling and Surgical Clipping of Unruptured Aneurysms in the Elderly

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Disclosures: I DO NOT have any financial or organizational relationships with commercial interests or other entities
Opting for intervention in unruptured intracranial aneurysms (UIA) is a complex decision that weighs:

1. Risk of peri-operative complications
2. Risk of aneurysmal rupture without surgery

Understanding the impact of age on peri-operative events and aneurysmal rupture risk can guide decision-making and inpatient management in the elderly.

We compared elderly and non-elderly patients undergoing intervention for UIA in regards to:

- Peri-operative mortality
- Peri-operative complications
- Healthcare usage (LOS, hospital charges)
Two parallel retrospective cohorts were formed for patients undergoing intervention for UIA, using National Inpatient Sample data from 2002-2013:

1. Surgical Clipping
2. Endovascular Coiling

Logistic regression analyses compared elderly and non-elderly groups within each cohort to examine peri-operative mortality, complications, length of stay (LOS), and admission costs.
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<tr>
<th></th>
<th>SURGICAL CLIPPING</th>
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<th>ENDOVASCULAR COILING</th>
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<td></td>
<td>Overall</td>
<td>Elderly</td>
<td>Non-Elderly</td>
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<tr>
<td></td>
<td>N=9,684</td>
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<td>N=7,679</td>
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<td>Age, Years ± SD</td>
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<td>50.3 ± 9.5</td>
<td>56.9 ± 12.9</td>
<td>71.4 ± 5.2</td>
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<td>Gender, %</td>
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<td>Peripheral Vascular Disorders, %</td>
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<td>Chronic Renal Failure, %</td>
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<td>Mean LOS, days</td>
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<td>Mean Hospital Charges, $</td>
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<td>83,919</td>
<td>82,334</td>
<td>87,960</td>
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RESULTS

Endovascular coiling cohort (n=11,911):

- Elderly patients did not experience higher odds of mortality
- Elderly patients had greater odds of post-operative deep vein thrombosis, pulmonary embolism, stroke, cardiac complication, and treated hydrocephalus.

Elderly vs. Non-Elderly:
Adjusted Odds Ratios for Peri-Operative Complications and Mortality in Endovascular Coiling Cohort
RESULTS

Surgical clipping cohort (n=9,684):

• 2.2% of elderly patients suffered peri-operative mortality, with a mortality odds ratio of 2.64 compared to non-elderly patients (p<0.001).

• Elderly patients experienced post-operative stroke, cardiac complication, and acute renal failure at double the rate of non-elderly patients.

Elderly vs. Non-Elderly:
Adjusted Odds Ratios for Peri-Operative Complications and Mortality in Surgical Clipping Cohort
Elderly patients had a significantly higher prevalence of comorbidities, longer LOS, and greater hospital admission costs ($p<0.001$).

Age remained an independent risk factor for in-hospital mortality and complications after controlling for the greater burden of comorbidities in the elderly.

Elderly candidates for CAC should be managed with caution of the 2.2% peri-operative mortality rate, weighed against the risk of mortality with continued non-interventional care. Established risk calculators can be used in decision making.$^4$

CAC and CACo groups should not be directly compared, as variables that lead to procedure selection are not recorded in the NIS such as surgical risk level, location, size, and aneurysm variables. This should serve as a descriptive analysis.
In the elderly, UIA intervention with CAC and CACo is healthcare resource-intensive incurring higher LOS and hospital charges than in the non-elderly, and associated with high risk of peri-operative complications from both interventions. There is a 2.2% peri-operative mortality rate associated with CAC in the elderly.

Further comparative effectiveness research is needed to weigh these costs and outcomes against those of conservative management.
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<thead>
<tr>
<th>Reference</th>
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