Excess mortality for operated geriatric hip fracture in Hong Kong

LP Man *, Angela WH Ho, SH Wong

ABSTRACT

Introduction: Geriatric hip fracture places an increasing burden on health care systems around the world. We studied the latest epidemiology trend of geriatric hip fracture in Hong Kong, as well as the excess mortality for patients who had undergone surgery for hip fracture.

Methods: This descriptive epidemiology study was conducted in the public hospitals in Hong Kong. All patients who underwent surgery for geriatric hip fracture in public hospitals from January 2000 to December 2011 were studied. They were retrieved from the Clinical Management System of the Hospital Authority of Hong Kong. Relevant data were collected using the Clinical Data Analysis and Reporting System of the Hospital Authority. The actual and projected population size, and the age- and sex-specific mortality rates were obtained from the Census and Statistics Department of Hong Kong. The 30-day, 1-year and 5-year mortality, and excess mortality following surgery for geriatric hip fracture were calculated.

Results: There was a steady increase in the incidence of geriatric hip fracture in Hong Kong. The annual risk of geriatric hip fracture was decreasing in both sexes. Female patients aged 65 to 69 years had the lowest 1-year and 5-year mortality of 6.91% and 23.80%, respectively. Advancing age and male sex were associated with an increase in mortality and a higher excess mortality rate following surgery.

Conclusion: The incidence of geriatric hip fracture is expected to increase in the future. The exact reason for a higher excess mortality rate in male patients remains unclear and should be the direction for future studies.

New knowledge added by this study

• Advancing age and male sex were associated with an increase in mortality and a higher excess mortality rate in Hong Kong following surgery for hip fracture.

Implications for clinical practice or policy

• The burden of geriatric hip fracture is expected to increase.
• Future studies should investigate the cause of an increased excess mortality in male patients who sustain a geriatric hip fracture.

Introduction

Geriatric hip fracture places an increasing burden on health care service providers around the world. Previous studies have shown that it is associated with significant morbidity and mortality. With the ageing population in many parts of Asia, it has been estimated that over half of all hip fractures will occur in Asia in 2050. Studies in France and the US have reported a drop in the incidence rate of geriatric hip fracture in the elderly population. This trend, however, has not been echoed by similar studies in Korea and Japan. Epidemiological studies performed in Hong Kong in 2007 and 2012 showed that, similar to western countries, there was a drop in the incidence rate of hip fracture in the territory. Hong Kong has one of the longest life expectancies in the world. The total number of geriatric hip fractures is expected to increase. It will therefore be important for policy-makers and society as a whole to adequately forecast future trends in the disease to prepare for the challenges ahead. This study aimed to analyse the latest trend in the epidemiology of geriatric hip fracture in Hong Kong, as well as to investigate the mortality rate and excess mortality rate in patients who underwent surgery for geriatric hip fracture.

Methods

Approximately 98% of geriatric hip fractures are managed in public hospitals run by the Hospital Authority of Hong Kong. All patients admitted to a public hospital in Hong Kong are assigned a code...
香港老年髖部骨折的超額死亡率
文樂邦丶何穎恆丶黃仕雄

引言: 老年髖部骨折不斷增加各國醫療系統的負擔。本研究旨在探討香港老年髖部骨折的最新流行病學趨勢, 以及進行手術的髖部骨折患者的超額死亡率。

方法: 我們採用描述性流行病學的方法研究香港公立醫院的數據。我們從香港醫院管理局的臨床管理系統檢索了所有在2000年1月至2011年12月期間在香港公立醫院接受手術治療的老年髖部骨折病例。我們從醫學管理局的檢索系統收集相關數據。從香港政府統計處獲得了實際和預計人口數字以及年齡和性別的具體死亡率。利用有關數據計算老年髖部骨折後的30天、1年和5年死亡率, 以及手術後的超額死亡率。

結果: 香港的老年髖部骨折發病率稳步上升, 而老年髖部骨折的年度風險率卻呈現減少的趨勢。65至69歲女性患者的1年和5年內死亡率為各年齡性別中最低, 分別為6.91%和23.80%。年老的男性手術後的超額死亡率為各年齡性別中最高的。

結論: 預計在未來老年髖部骨折的現患率將持續上升。導致男性病人有較高超額死亡的原因仍然不明, 日後的研究可循此方向進行。
Discussion
A slight decrease in the annual risk of geriatric hip fracture was noted in this study. This trend echoes that of similar studies in the territory and in some western countries.\textsuperscript{5,6,10} Such a decrease has been postulated to be related to improved availability of medical intervention to prevent osteoporosis, increased attention to menopause and hormonal replacement therapy, changes in lifestyle, and community fall prevention programmes. Nonetheless few studies have been able to prove any causal relationship.

Surgery is generally offered to patients with geriatric hip fracture in order to decrease the morbidity and mortality associated with prolonged immobilisation. In this study, patients who were managed non-operatively were excluded as they represented a very small proportion of patients (estimated to be <1%) with poor pre-morbid medical conditions and very high anaesthetic risk.

Despite the decreasing annual risk of geriatric hip fracture, it is important to relate this to the ageing population in the territory. Using the projected percentage of elderly aged ≥65 years in Hong Kong,\textsuperscript{11} and assuming that the annual risk of hip fracture remains the same, we estimate that there will be more than 6300 cases of hip fracture in the year 2020. In the year 2040, the annual incidence of geriatric hip fracture will be more than 14 500, more than a 3-fold increase from 2011. Unless effective primary prevention measures are put in place, the burden of geriatric hip fracture on the public health system will continue to increase. Policy-makers should invest in the relevant specialties and departments in order to tackle the inevitable challenges ahead.

To our knowledge this is the first study to review the excess mortality of operated geriatric hip fracture in the territory. A systematic epidemiological review by Abrahamsen et al\textsuperscript{14} showed that the 1-year excess mortality rate following hip fracture ranged from 8.4% to 36%. In this study, the 1-year excess mortality following surgery for geriatric hip fracture ranged from 6.22% to 23.45%. Echoing the result of

<table>
<thead>
<tr>
<th>TABLE 1. Postoperative mortality rates for geriatric hip fracture</th>
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<tbody>
<tr>
<td><strong>Age-group (years)</strong></td>
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<td></td>
</tr>
<tr>
<td>65-69</td>
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<tr>
<td>70-74</td>
</tr>
<tr>
<td>75-79</td>
</tr>
<tr>
<td>80-84</td>
</tr>
<tr>
<td>≥85</td>
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<tr>
<td>Overall</td>
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</tbody>
</table>

* Calculation based on data from patients who underwent surgery from year 2000 to 2006
Abrahamsen et al, we also identified that men had a higher excess mortality rate after operation for geriatric hip fracture. The reasons for this higher excess mortality rate in males remain unclear. Endo et al reported that male gender was a risk factor for sustaining postoperative complications such as pneumonia, arrhythmia, delirium, and pulmonary embolism, even after controlling for age and the American Society of Anesthesiologists rating, as well as a higher mortality 1 year after hip fracture. Another study by Wehren et al reported an increased rate of death from infection in males for at least 2 years after hip fracture, suggesting that infection may contribute to the differential risk of death.

There are limitations to the present study. Patients with geriatric hip fracture who were treated in the private sector were not included, although they constituted only a small proportion of the total number of cases. Chau et al reported that approximately 98% of hip fractures were managed in the Hospital Authority.

In the CDARS of the Hospital Authority, the date of death was provided by the death registry of the Immigration Department of Hong Kong. We were unable to capture data for deaths that occurred outside the territory. Under the laws of Hong Kong, only deaths that occur in Hong Kong are registered with the Deaths Registries. According to the Census and Statistics Department, approximately 9% of the elderly population resides in the mainland. As Hong Kong residents are currently not eligible for free or subsidised health services in the mainland, we believe many elderly people will return to Hong Kong for medical treatment.

Other risk factors that may contribute to the excess mortality such as smoking and pre-morbid health status were not included in the present study. Further studies should also investigate the incidence and mortality of other fragility fractures. The effect of primary and secondary prevention by anti-osteoporotic medications on the incidence of geriatric hip fracture is also a potential area for further study.

### Table 2. Age- and sex-specific excess mortality of geriatric hip fracture

<table>
<thead>
<tr>
<th>Age-group (years)</th>
<th>1-Year postoperative mortality (%)</th>
<th>Age-specific mortality rate in Hong Kong (%)</th>
<th>Age- and sex-specific excess mortality rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>65-69</td>
<td>6.91</td>
<td>15.68</td>
<td>0.69</td>
</tr>
<tr>
<td>70-74</td>
<td>9.01</td>
<td>18.29</td>
<td>1.31</td>
</tr>
<tr>
<td>75-79</td>
<td>11.10</td>
<td>22.10</td>
<td>2.38</td>
</tr>
<tr>
<td>80-84</td>
<td>13.63</td>
<td>27.19</td>
<td>4.33</td>
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<tr>
<td>≥85</td>
<td>19.80</td>
<td>36.40</td>
<td>9.82</td>
</tr>
</tbody>
</table>

**Conclusion**

Geriatric hip fracture will continue to be a major challenge for the health care system in the foreseeable future. Despite the emphasis on early surgery for geriatric hip fractures in recent years, the risk of premature death remained high for patients who underwent surgery for hip fracture. Future studies should be directed to identify the causes of this excess mortality and patients who are at increased risk of premature death, so that early interventions can be initiated to reduce their risk.

**Acknowledgements**

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References