Treatment of octogenarians with lung cancer: A single centre audit of treatments and outcomes

Irina Baimatova, Catherine Smith, Lutz Beckert, Harsh Singh

ABSTRACT

AIMS: Document the incidence, stage at presentation and therapy offered to octogenarians with non-small cell lung cancer (NSCLC) over 3 years and compare to those under 80 years old.

METHODS: A retrospective analysis of patients with NSCLC managed via a lung cancer multidisciplinary team at Canterbury District Health Board. Follow-up data at one year following presentation was analysed.

RESULTS: The study population comprised 124 octogenarians (mean 83.7 years), of whom 54 (42%) were female. Participants presented with adenocarcinoma 48 (38.7%), squamous cell 35 (28.2%) and without tissue diagnoses 41 (33.1%). Stage I and II lung cancer was found in 43 (34%) patients. Surgical resection ensued in six (4.8%), radiotherapy with curative intent in 20 (16.1%), non-curative treatment options in 98 (79%), compared to 106 (15.4%), 112 (15.6%) and 431 (67.2%) respectively of the 635 patients in the under 80 group with NSCLC. All of the surgical group and 15 (75%) in the radiotherapy group of octogenarians were alive at one year; which is comparable to the rest of the cohort, where all patients of the surgical group and 63 (64.2%) of the radiotherapy group were alive at one year.

CONCLUSION: Octogenarians who undergo radiotherapy or surgery with curative intent have an excellent one year survival. Because all patients were alive at one year following surgical resection, we conclude that surgery seems to be a viable treatment option in octogenarians, which may be underutilised.

The population of 80–89 year olds living in New Zealand is currently 130,053 (3.1% of the population)1 and is increasing since the 2001 census, which recorded 94,794 octogenarians (2.5% of the population).2 Currently, the life expectancy is 80.9 years,3 however people born today are expected to live into their late 80s or early 90s.4

Lung cancer is the leading cause of death from cancer in New Zealand, contributing to 18.9% of deaths in 2011 from cancer.5 There is variation in outcomes across New Zealand, leading to a wide range of five-year survival rates from 4–14%.6 The mean age at diagnosis has been increasing in recent years. It remains the third leading cause of death from cancer in the developed world. 7

Treatment depends on histology, genetics, staging and overall physical health of the patient. Stage I–II non-small cell cancer (NSCLC) is routinely considered for treatment with curative intent. Radiotherapy with curative intent is generally offered to patients with resectable tumours who are not fit for surgery or decline surgery.

Some researchers have argued that more aggressive management in octogenarians with lung cancer may be appropriate.8 This audit reports on the incidence, stage at presentation, and therapy offered to octogenarians with NSCLC and compares them to those of the under 80 years old at the time of diagnosis.

Methods

Canterbury District Health Board offers specialist thoracic surgical services for most of the South Island, serving a population of about 500,000. Since 2009, all patients with lung cancer are presented at Multidisciplinary Meeting (MDT) as per international guidelines.9 Records of these meetings were reviewed for this audit. The patient cohort
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comprised those presented with a diagnosis of NSCLC in the time period from June 2009 until December 2012, allowing for at least a year of follow up. The inclusion criteria were patients 80–89 years with a NSCLC diagnosis. Exclusion criteria were: metastatic cancer to the lung; mesothelioma; small-cell lung cancer; patients presenting with recurrence; a primary diagnosis confirmed prior to their eightieth year; and patients who chose to receive treatment outside the Canterbury region.

The frailty score was calculated as published by CSHA clinical frailty index. Comorbidities were measured using the Charleston Comorbidities index. A scoring system was not in place, but the comorbidities were counted using their classification of comorbidity.

This study was a retrospective audit and did not need ethics approval according to the New Zealand Ministry of Health, as no individual patients were identified. The statistical methods used for all calculations was Fisher’s exact two-tailed P test, using GraphPad Prism (GraphPad Software Inc 2009).

Results

124 octogenarians were identified. They consisted of 57% (70/124) men and 43% (54/124) women (ratio 1.3:1) with a mean age of 83.7 years (range 80–89 years). The demographics, histological type, and treatment received are summarised in Table 1. The distribution of the cancer type was similar to the rest of the cohort, with a larger proportion of octogenarians not receiving a confirmed tissue diagnosis.

Figure 1 summarises the cytological or histologically confirmed lung cancers of Table 1: The number, gender distribution and stage of NSCLC diagnosed in octogenarians and those under 80, diagnosed between June 2009 and December 2012.

<table>
<thead>
<tr>
<th></th>
<th>80–89 years old</th>
<th>Under 80 years old</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study population</td>
<td>124 (100%)</td>
<td>635 (100%)</td>
<td>-</td>
</tr>
<tr>
<td>Female, n (%)</td>
<td>54 (43.5%)</td>
<td>286 (45.0%)</td>
<td>0.77</td>
</tr>
<tr>
<td>Adenocarcinoma</td>
<td>48 (38.7%)</td>
<td>321 (50.6%)</td>
<td>0.018</td>
</tr>
<tr>
<td>Squamous cell carcinoma</td>
<td>35 (28.2%)</td>
<td>192 (30.2%)</td>
<td>0.77</td>
</tr>
<tr>
<td>No tissue diagnoses</td>
<td>41 (33.1%)</td>
<td>122 (19.2%)</td>
<td>0.001</td>
</tr>
<tr>
<td>Surgical resection n (%)</td>
<td>6 (5%)</td>
<td>106 (16.7%)</td>
<td>0.0003</td>
</tr>
<tr>
<td>Curative Radiotherapy</td>
<td>20 (16%)</td>
<td>98 (15.4%)</td>
<td>0.89</td>
</tr>
<tr>
<td>Non-curative treatment</td>
<td>98 (79%)</td>
<td>431 (67.2%)</td>
<td>0.01</td>
</tr>
</tbody>
</table>

Figure 1: Pathology and staging of lung cancer in octogenarians at presentation

This bar chart summarises the number of octogenarians’ clinical stage and histological diagnosis at presentation.
the octogenarians. 41 patients did not have a tissue diagnosis. Two patients were left out of the staging (and the Figures above) as further investigation was not felt to be appropriate: one patient refused all further treatment and follow up, the other patient was on end-of-life treatment and passed away shortly after diagnosis. No patients were excluded from the under-80 group. More than half of the octogenarians presented at an advanced stage (stage III–IV). Two histologies were identified: adenocarcinoma and squamous cell carcinoma; no patient was diagnosed with large cell carcinoma.

Treatment choices
Surgical treatment with curative intent was offered to six (4.8%) of 124 octogenarians, compared to 106 (17.7%) of the 635 of patients under 80 (p 0.0003). Radiotherapy with curative intent was offered to 20 (16.1%) octogenarians, compared to 98 (15.4%) in the rest of the cohort (p 0.89). Non-curative treatment options include best supportive care, radiotherapy with palliative intent and palliative chemotherapy. Non-curative treatment was offered to 98 (79.0%) of octogenarians, compared to 431 (67.9%) under 80 (p 0.01), showing a statistically significant difference in treatment options.

Frailty and comorbidities
Of the 46 octogenarians who presented with early stage (I and II) lung cancer, six were offered surgery, 20 radiotherapy with curative intent and the remaining 20 were offered best supportive care. The total frailty score of all the 124 octogenarians was 3.6; the frailty score of the advanced disease group 3.9 and the frailty score of the group with limited disease group 3.2. The frailty score of octogenarians who presented with stage I or II lung cancer and who received radiotherapy was 2.6 and frailty score of the group operated on was 2.4 (Table 2).
Of the 26 patients who were offered radiotherapy or surgery with curative intent, four (15%) were judged to have no significant co-morbidities, five (19%) to have one, three (12%) had two and five (19%) had three co-morbidities. The six patients who underwent surgical resection had the lowest frailty score (2.4) and they had between 0 and 6 comorbidities. All octogenarians had an excellent post-op recovery and all survived at least 1 year following surgical resection of their tumour.

Mode of presentation

Of the patients that presented with disease at a curative stage, the majority had their lung cancer diagnosed from an incidental finding.

Treatment outcome

Of the six octogenarians who were offered surgery, all were alive at one year (100%) which is the same as the cohort’s survival post-surgery of 106/106 (100%). The surgeries offered one wedge resection, which later required a completion lobectomy, one pneumonectomy and four lobectomies. None received adjuvant chemotherapy, although one patient was offered adjuvant therapy and declined. Of the 20 octogenarians who underwent radiotherapy with curative intent, 15 (75%) were alive at one year, compared to 63 (64.2%) (p 0.52) of 98 patients in the under 80s group who were alive at one year post radiotherapy with curative intent. Two of the octogenarians died of cardiac events and one of pneumonia both deemed not related to disease or treatment.

Discussion

124 (16%) of our patients with NSCLC were octogenarians, of which 46 (37%) presented with stage I and II lung cancer. However only six (5%) were offered surgery and 20 (16%) radiotherapy with curative intent. Of the octogenarians offered radiotherapy, 75% were alive at one year, and of those offered surgery, 100% were alive at one year. While the percentage offered radiotherapy is similar, the percentage offered surgery is less compared to the rest of the cohort, six (5%) versus 106 (15%) (p <0.0003). This difference is not fully explained by the frailty score of the octogenarian which was 3.6 for the cohort and 3.2 for the group with early disease.

This excellent survival in octogenarians is in concordance with other studies that report acceptable long-term survival post resection. Octogenarians should not be excluded on age alone. They have comparable outcomes following surgery and radiotherapy at one year (75% vs 64.2%) (p 0.52). The survival post-surgery in octogenarians is equal to those under 80, with no deaths in either group. Our data suggests that we may have been conservative in offering surgery to octogenarians. If one were to consider a frailty score of 4 or less acceptable for surgery, more than a third of our population could have been considered for surgery. Although the frailty score is not a reliable predictor of outcome, it is more robust than just adding co-morbidities.

While not taking in account patient preferences, it does suggest that potentially 11 (9%) octogenarians were not offered therapy with curative intent, despite presenting at an early stage with a frailty score of four or less. Of the advanced stage, 53 patients had a frailty score of less than 4 and could have been potentially fit for surgery should they have been detected at an earlier stage.

Of note is that two-thirds (67%) of the octogenarians with early stage lung cancer...
cancer were identified incidentally. Most patients presenting with symptoms were in an advanced stage. Late presentation and diagnosis is not exclusive to the elderly populations. Cancer Research UK shows 67.7% of patients with lung cancer presented at stage III to IV. Chest X-rays have poor sensitivity at demonstrating early lung cancer, offering false reassurance to patients. Internationally, guidelines are being developed to offer screening for a targeted group of patients with an at least 20 pack/year history of smoking and age 50–75 years. Our data suggests the average octogenarian is not frail and could potentially be fit for surgery should their diagnosis of NSCLC be made at a curative stage. As most of our patients were asymptomatic on presentation, we suggest that screening in a population above the age of 80 may be of value.

This was a retrospective single centre study. All scoring was applied retrospectively. We were unable to adjust for confounding factors due to study population size. There is also a potential for referral bias as some patients were referred directly to palliative care services, therefore forgoing our MDT meeting. We are still not able to look at five-year data as our database has only been active since 2009.

### Conclusion

Octogenarians carry a large burden of lung cancer. Only a small number of patients are being offered curative intent treatment, surgery or radiotherapy. Octogenarians cope well with curative treatment and should be referred and considered for curative treatment including surgery. All patients were alive at one year following surgical resection, which suggests that surgery may be underutilised in this age group.

<table>
<thead>
<tr>
<th></th>
<th>Stage I / II</th>
<th>Advanced Stage</th>
<th>Operated</th>
<th>Potential</th>
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</thead>
<tbody>
<tr>
<td>Frailty score ≤ 4</td>
<td>37</td>
<td>53</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>Frailty score &gt; 4</td>
<td>10</td>
<td>24</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Summarises a retrospective analysis of stage and frailty score.

### REFERENCES:

4. How long will I live?

### Competing interests:
Nil

### Author information:
Irina Baimatova, Department of Cardiothoracic Surgery, Canterbury District Health Board, Christchurch Hospital, Christchurch; Catherine Smith, Respiratory Medicine, Canterbury District Health Board, Christchurch Hospital, Christchurch; Lutz Beckert, Respiratory Medicine, Canterbury District Health Board, Christchurch Hospital, Christchurch; Harsh Singh, Department of Cardiothoracic Surgery, Canterbury District Health Board, Christchurch Hospital, Christchurch

### Corresponding author:
Irina Baimatova, Department of Cardiothoracic Surgery, Canterbury District Health Board, Christchurch Hospital, Christchurch 8140, New Zealand
irina.baimatova@cdhb.health.nz

### URL:


