Lung cancer resection rates have increased significantly in females during a 15-year period

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Abstract

Objective: The aim was to carry out a comparative study of lung cancer incidence and resection rates following the introduction of positron emission tomography—computed tomography (PET—CT) and the reorganisation of Cancer Services in Northern Ireland. Methods: Data were retrieved from the Regional Thoracic Service Database and Northern Ireland Cancer Registry (NICR) covering the period 1994—2008. The two databases are maintained independently. A total of 13 288 lung cancer cases and 1575 lung resections were identified. Secondary tumours were excluded. The incidence of lung tumours and procedures performed was available for each individual year. The incidence of lung cancer was taken from the NICR. The NICR confirmed the diagnosis of lung cancer using international guidelines and cancer was confirmed by histology, cytology, radiological investigations and post-mortem examinations. Poisson regression was used to model the incidence and resections per year; logistic regression was used to model the yearly rate of resections per incidence case. The 15-year period was divided into three periods to assess trends in surgical resection, but the surgical resection rate (SRR) was calculated on a yearly basis. Results: The regional incidence of lung cancer in Northern Ireland (NI) females has increased (1.7% per annum P < 0.01, Poisson regression), but this increase has not been seen in males. The incidence of lung cancer patients, who underwent resection at the regional Thoracic Surgery Unit, increased for females (4.4% per annum, P < 0.01, Poisson regression), but not for males. The proportional rate of resection (number of resections in a given year/incidence in that year) has changed significantly over the study period for females but not males (the odds ratio per unit year was 1.029, P < 0.01, logistic regression). The average age of females increased by 0.2 year (P < 0.01) annually; there was no significant increase in the age of males over this period. There was no significant overall rise in the number of patients diagnosed with non-small-cell lung cancer (NSCLC). The percentage of all lung cancer patients who were discussed at multidisciplinary team (MDT) meetings rose from 19% in 1996 to 64% in 2006. The percentage of patients aged over 75 years discussed at an MDT increased from 12% in 1996 to 58% in 2006. The number of females presenting with NSCLC and the number of people presenting with stage I and II disease did not change over the time frame. More patients aged above 70 years had an operation in group III. These accounted for over 50% of the increase in operations between the first and last group. The number of females in this group rose by 92% compared with group I. Significantly, more patients aged over 80 years had an operation in group III than in group I; however, there was significantly more males treated surgically aged over 80 years than females; P = 0.001. Conclusions: The resection rate is currently higher in females than males, and has significantly increased during the study period. The incidence in female lung cancer has risen but it is still below male incidence rates. It seems unlikely that one single factor has brought about this increase. With better education among medical practitioners and the public, more lung cancer cases have been considered for surgery by surgeons. There has been an overall increase in patients presented at MDTs involving thoracic surgeons. For whatever reason, it appears that many lung cancer cases in females had previously not been presented to surgeons prior to the introduction of MDT meetings practice guidelines. The development of MDT meetings throughout NI along with the close involvement of the Thoracic Surgical Unit from the inception of all MDTs seems the most likely factor leading to a change in lung cancer resection rates.

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1. Introduction

Northern Ireland (NI) has a population of 1.6 million people with a mean of 890 cases of lung cancer diagnosed every year [1]. Non-small-cell lung cancer (NSCLC) kills over 30 000 people per year and accounts for 5.6% of all deaths in the United Kingdom [2]. In NI, from 1993 to 2006, on average, 550 males and 340 females, were diagnosed with cancer of the lung, with 498 male and 297 female mortalities annually. Cancer of the lung annually accounts for 12.6% of cancer cases and 26.6% of cancer deaths in males, and 7.6% of cancer cases and 16.8% of cancer deaths in females. Lung cancer is the most common cause of cancer death in males, and, since the late 1990s, it has caused marginally more deaths than breast cancer [3]. In males under 65 years of age, there has

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been a 3% annual decline in age-standardised incidence over the period 1993–2006, but not in females. This suggests that the risk factors for males may be decreasing [3].

Fifty years ago, Lord Brock commented that the only reliable chance of potential cure for lung cancer is a complete and timely resection in a patient with an appropriately staged tumour [4]. Other treatment modalities have improved since that time but surgery still remains the fundamental treatment for stage I and II disease. The number of patients treated surgically expressed as a percentage of the total number of cases diagnosed is called the surgical resection rate (SRR). The SRR can be used as one measure of a region's effectiveness in treating lung cancer. When the SRR of the United Kingdom at 14% [2,5] is compared to similar populations in both the European Union and the United States of America it appears that the United Kingdom is under-performing [2,5–8]. There is, however, marked variation between UK regions [2,5,9].

The care pathway for cancers in NI has been restructured according to the recommendations of a number of reports. In 1996, a report titled, 'Cancer services: Investing for the future' was produced. This was the first local report on cancer care and has subsequently become known as the 'Campbell report' [10]. This led to a Cancer Working Group producing a subgroup report on lung cancer [11]. In 2005, the National Health Service in England and the National Institute for Clinical Excellence produced guidelines on the diagnosis of lung cancer [12], with guidance also produced that year by the Scottish Intercollegiate Guidelines Network [8]. In 2007, a major programme titled 'The Reform of Cancer Services' was introduced.

The objectives of this study are to investigate the trends in lung cancer resection rates in NI from 1994 to 2008 and with additional assistance of clinical audit data for the years 1996, 2001 and 2006. Factors influencing the resection rate for lung cancer in the Regional Thoracic Surgery Unit during a 15-year period have been identified. This has not been previously reported for NI and similar data have not been widely reported elsewhere in the world in this way.

NI was the second centre in the UK to provide a clinical positron emission tomography service combined with computed tomography (PET–CT) in 2002. Among the priority groups given full access to PET–CT were lung cancer patients.

2. Materials and methods

Information on surgical procedures carried out in NI’s single thoracic surgery unit is entered prospectively into the Regional Thoracic Surgery database. Information on lung cancer incidence rates was received from the Northern Ireland Cancer Registry. Individual patient information was not linked between the two data sources and lung cancer is defined as per the ICD-10 classification C33–34 for both databases.

A retrospective review was carried out of all the patients identified by the above databases who underwent surgical resection. The period of study was from 1 January 1994 to the 31 December 2008. Baseline demographic information, including age, sex, date of diagnosis and co-morbidities, age at surgery, diagnosis, procedure and outcomes, were recorded. Survival data were used from the Lung Cancer Audit [3].

During the study period, each of four health boards set up a multidisciplinary team (MDT) specifically for lung cancer. The involvement of a thoracic surgeon was an essential part of the process of assessment and by 2004, all MDT meetings had thoracic surgeons present.

The incidence of lung cancer was available for each year along with the number of surgical procedures. This allowed analysis of the SRR on a yearly basis. The incidence of tumours was taken from the NICR and included all patients who were diagnosed by radiological, histological, cytological or post-mortem examinations.

The Thoracic Surgery Database information was summarised (e.g., numbers of operations, lung cancer types and number of patients of certain ages) by dividing the years 1994–2008 into three groups. Group I was the period 1994–1998; group II 1999–2003 and group III 2004–2008. The NICR lung cancer audit was carried out for individual years and gives a snapshot of current trends in the median year of each group. This report was used to assess data such as the comorbidities of the patients, the number of patients being discussed at an MDT and the stage of tumour at surgery and presentation. The data from the Thoracic Surgical Database were analysed by linear, Poisson or logistic regression as appropriate to model the yearly trends in age incidence or rates (proportions), respectively.

Secondary tumours were excluded from analysis. Exploratory-only thoracotomies were excluded from the surgical resection data; however, they were analysed separately to give an indication of the quality of staging.

The SRR was calculated for each year by dividing the number of resections performed yearly in the Regional Thoracic Surgery Unit by the lung cancer incidence. Table 1 refers to the non-small-cell resection rate. This was calculated by dividing the number of resections by the incidence of non-small-cell tumours for NI. This is separate from the SRR and, as expected, is higher than the SRR. Only the SRR will be discussed in this article.

The categorical data were compared using chi squared or Fisher’s exact test. Quantitative variables were described using mean, standard and range deviation. The Kolmogorov–Smirnov analysis was used to measure normality. Logistic and Poisson regression were used when appropriate. Survival was plotted using the Kaplan–Meier method and statistical significance was defined by P values <0.05 throughout. The data were analysed using SPSS 16 and STATA.

3. Results

During the study period, 13,288 lung cancer cases and 1,575 lung resections were identified. The regional incidence of lung cancer in NI is displayed in Fig. 1 (source: NICR). Incidence has increased for females (1.7% per annum \(P < 0.01\), Poisson regression), but not for males.

The incidence of lung cancer patients undergoing resection is given in Fig. 2 (source: Regional Thoracic Surgery database). SRR has increased for females (4.4% per annum, \(P < 0.01\), Poisson regression), but not for males. The SRR during the full study period revealed an increase from 9% to...
15%, which represents a relative 66% increase in resection rate in females. Logistic regression was used to assess if there was an increase in resection rate (%) between males and females over the time period 1994–2007 (Fig. 3). The numerator of the SRR came from the Regional Thoracic Surgery database, the denominator from the NICR; the databases of each were not directly linked; however, the predicted rates are broadly similar to those reported in the Lung Cancer Audit[3]. The increasing trend in SRR (%) over time was significant in females (the odds ratio per unit year was 1.029, \( P < 0.01, \) logistic regression), but not in males. The increasing trend in those aged over 70 years was significant in females (the odds ratio per unit year was 1.067, \( P < 0.01, \) logistic regression), but not in males (Fig. 3).

The mean age at surgery of both males and females diagnosed each year with lung cancer was calculated and ordinary least squares analysis was used to analyse their trends in age with time (Fig. 4). There was no evidence of non-linearity (quadratic terms were not required). The mean yearly age of female surgical patients increased by 0.2 year (\( P < 0.01); \) there was no significant yearly increase in the age of males over this period.

The regional incidence of NSCLC in NI has increased over time for females (2.4% per annum \( P < 0.01, \) Poisson regression), but not for men. All persons incidence increased by 1.07% annually (\( P < 0.01, \) Poisson regression). The number of undiagnosed and non-histologically verified patients decreased. The number of patients unstaged amongst those referred to oncology had decreased significantly by 2006, according to other sources[3].

Table 1 identifies the characteristics of the patients and the operations performed. The mean ages from patients in

<table>
<thead>
<tr>
<th>Surgical patients</th>
<th>Group I</th>
<th>%</th>
<th>Group II</th>
<th>%</th>
<th>Group III</th>
<th>%</th>
<th>Teesside</th>
<th>%</th>
<th>Varese</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (SD)</td>
<td>64 (10)</td>
<td></td>
<td>64 (10)</td>
<td></td>
<td>65 (10)</td>
<td></td>
<td>69 (10)</td>
<td></td>
<td>67 (10)</td>
<td></td>
</tr>
<tr>
<td>Mean age females (SD)</td>
<td>62 (10)</td>
<td></td>
<td>64 (11)</td>
<td></td>
<td>64 (10)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Mean age males (SD)</td>
<td>65 (9)</td>
<td></td>
<td>64 (10)</td>
<td></td>
<td>65 (10)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Patients over 70</td>
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<td>170</td>
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<td>224</td>
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<td>61</td>
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<td>86</td>
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<td>Males over 70</td>
<td>97</td>
<td></td>
<td>109</td>
<td></td>
<td>138</td>
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<td>Patients over 80</td>
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<td>1.3</td>
<td>11</td>
<td>2.2</td>
<td>26</td>
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<td></td>
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<tr>
<td>Males over 80</td>
<td>4</td>
<td></td>
<td>6</td>
<td></td>
<td>20</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Bilobectomy</td>
<td>29</td>
<td></td>
<td>6</td>
<td></td>
<td>4</td>
<td>26</td>
<td>4</td>
<td></td>
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<tr>
<td>Lobectomy</td>
<td>232</td>
<td>50</td>
<td>266</td>
<td>54</td>
<td>333</td>
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<td>Pneumonectomy</td>
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<td>Segmentectomy</td>
<td>19</td>
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<td>29</td>
<td>6</td>
<td>14</td>
<td>3</td>
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<td></td>
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<tr>
<td>Wedge excision</td>
<td>67</td>
<td>15</td>
<td>78</td>
<td>16</td>
<td>107</td>
<td>17</td>
<td></td>
<td></td>
<td></td>
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<td>Chest wall resection</td>
<td>7</td>
<td>2</td>
<td>11</td>
<td>2</td>
<td>9</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Total operations</td>
<td>462</td>
<td></td>
<td>522</td>
<td></td>
<td>617</td>
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<td></td>
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<tr>
<td>Incidence all patients</td>
<td>2377</td>
<td>53</td>
<td>2328</td>
<td>53</td>
<td>2622</td>
<td>55</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>NSCLC</td>
<td>523</td>
<td>12</td>
<td>459</td>
<td>10</td>
<td>566</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>SCLC</td>
<td>1544</td>
<td>35</td>
<td>1602</td>
<td>37</td>
<td>1598</td>
<td>33</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Total</td>
<td>4444</td>
<td></td>
<td>4389</td>
<td></td>
<td>4786</td>
<td></td>
<td></td>
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<tr>
<td>Exploratory thoracotomy rate</td>
<td>7.5</td>
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<td>5.2</td>
<td></td>
<td>4.6</td>
<td></td>
<td></td>
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<td>NSCLC resection rate</td>
<td>19</td>
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<td>22</td>
<td></td>
<td>24</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Fig. 1. The regional incidence of lung cancer in N. Ireland (source: N. Ireland Cancer Registry) has increased over time for females (1.7% per annum \( P < 0.01, \) Poisson regression), but not for males.

Fig. 2. The number of lung cancer patients who received a resection at the regional Thoracic Surgery Unit (source: Regional Thoracic Surgery database) has increased for females (4.4% per annum, \( P < 0.01, \) Poisson regression), but not for males.
Teesside and Varese (Italy) are included for reference [7]. The number of lobectomies performed has increased over time (3% increase per year, \( P < 0.01 \), Poisson regression).

Data from the Lung Cancer Audit [3] indicate that the number of patients discussed at an MDT increased over the study period from 19% in 1996 to 64% in 2006. In 1996, 12% of the over-75 patients were presented to an MDT. By 2006, this increased to 58% of over 75 patients with lung cancer [3]. An indication of the potential pool of patients available for surgical treatment is given by the number presenting with early- or late-stage disease. The incidence of stage I and II disease has not significantly increased over the study \( P = 0.051 \). The incidence of stage IV disease has increased significantly with a \( P < 0.0001 \). The number of people surgically treated with stage I and II disease has not significantly increased between the two groups (Table 2).

Patients treated surgically aged above 70 years increased by 82 patients between group I and group III. This failed to reach significance \( P = 0.16 \); however, this does demonstrate that 82 'extra' cases were performed in the over-70 age group. The over-70 males increased by 41 cases (46%); however, the over-70 females increased by 41 cases, which is a 91% rise in numbers.

Patients treated surgically aged above 80 years at the time of operation increased by 20 cases from group I to group III. This was significant with a \( P = 0.003 \) and a strong linear-by-linear association; \( P = 0.001 \). This becomes more interesting when the data are broken down by sex. Only six females over 80 years of age were operated on in 1996, compared to 16 in 2006.

Table 2

<table>
<thead>
<tr>
<th>Year</th>
<th>MDT meeting documented in notes</th>
<th>All patients</th>
<th>TNM stage</th>
<th>Surgery patients</th>
<th>Histopathology</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDT meeting documented in notes</td>
<td>0–54</td>
<td>13</td>
<td>23</td>
<td>42</td>
<td>63</td>
</tr>
<tr>
<td>All patients</td>
<td>55–64</td>
<td>32</td>
<td>22</td>
<td>81</td>
<td>54</td>
</tr>
<tr>
<td>65–74</td>
<td>67</td>
<td>22</td>
<td>126</td>
<td>45</td>
<td>200</td>
</tr>
<tr>
<td>&gt;75</td>
<td>23</td>
<td>12</td>
<td>89</td>
<td>40</td>
<td>163</td>
</tr>
<tr>
<td>All patients</td>
<td>135</td>
<td>19</td>
<td>338</td>
<td>47</td>
<td>537</td>
</tr>
<tr>
<td>TNM stage</td>
<td>Stage I</td>
<td>68</td>
<td>9</td>
<td>95</td>
<td>13</td>
</tr>
<tr>
<td>All patients</td>
<td>Stage II</td>
<td>35</td>
<td>5</td>
<td>39</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Stage IIIA</td>
<td>34</td>
<td>5</td>
<td>45</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Stage IIIB</td>
<td>74</td>
<td>12</td>
<td>40</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Stage IV</td>
<td>232</td>
<td>33</td>
<td>250</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>Not recorded</td>
<td>252</td>
<td>36</td>
<td>247</td>
<td>35</td>
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<tr>
<td>Total</td>
<td>705</td>
<td>716</td>
<td>834</td>
<td>834</td>
<td>834</td>
</tr>
</tbody>
</table>
the age of 80 were operated on in group III. Males, however, increased from four in group I to 20 in group III (Table 1).

4. Discussion

In 1996, the Cancer Services Working Group produced 14 key recommendations in a document, which has become known as the ‘Campbell report’ [10]. The objective was to reorganise cancer services in NI. The report suggested that the management of cancer patients should be undertaken by appropriately trained, organ- and disease-specific medical specialists. Patients should be managed in MDTs and NI should have one cancer centre. It advised that the referral process was to be streamlined for patients presenting to non-cancer hospitals.

A subsequent subgroup report for lung cancer focussed on the need for education of patients and health-care professionals in smoking cessation and the relevance of suspicious symptoms in smokers. It aimed to streamline the referral pathways between general practitioners and the receiving hospitals along with enhancing communication between all parties, for example, general practitioners, hospital specialists, patients and palliative services.

The Cancer Plan in England introduced cancer waiting times and targets, specifically, the 31 days from diagnosis to treatment, and 62 days from urgent referral to treatment. These changes have been introduced into NI over the last 2 years.

The SRR for females has significantly increased over the past 15 years and is now higher in females than in males. Understanding the factors, which contribute to this change, gives an important insight into how the epidemiology of the disease and patient profile is changing and how resources can be directed to deal with this in the future.

The calculation of the SRR compensates for an increase in incidence of lung cancer. As the incidence rises, the number of resections must rise proportionately; otherwise, the SRR would fall. The incidence in females has risen but only by a small margin. Males presenting with lung cancer still outnumber females. The potential pool for surgical candidates has not changed in respect to the population characteristics, and the incidence of stage I and II tumours has not risen either at the time of operation or in the general population. The incidence of stage I and II tumours has not risen specifically in females. If the potential pool of patients has not changed in size, then other factors must contribute to the rising SRR in females.

Other countries have noticed a rise in female incidence secondary to smoking [13—15] and a subsequent change in the patient demographics. The regional incidence of NSCLC in NI has increased over time for females, but not for men. All persons incidence increased by 1.07% annually. This could be due to better staging and histological verification of tumours. The rising resection rate cannot be therefore explained by a lack of symptom awareness or suspicion of cancer by the practitioners.

The co-morbidities of patients treated surgically have not changed significantly over the study period [3]. Table 3 lists co-morbidities and compares NI to Teesside and Varese. This would suggest that NI has a similar co-morbidity pattern to Teesside but higher than Varese.

The co-morbidities of patients treated surgically have not changed significantly over the study period [3]. Table 3 lists co-morbidities and compares NI to Teesside and Varese. This would suggest that NI has a similar co-morbidity pattern to Teesside but higher than Varese.

Linnane and O’Keefe suggest that PET—CT may increase resection rates by rendering cases operable when they may have been inoperable on CT [19]. Studies from van Tinteren, Hoekstra and Kaliff indicate that PET—CT lowers resection
rates [20—22] and this is in keeping with other audits in oesophageal and lung cancer resection in NI. According to the Linnane thesis, there remains only one avenue by which NI may have increased its resection rates so dramatically: ‘an increase in the resection of patients previously deemed inoperable by virtue of co-morbid conditions.’ The most significant of these co-morbid conditions in our data seems to have been age, assuming that age can be classified as a co-morbidity.

The British Thoracic Society Guidelines on the selection of patients with lung cancer for surgery 1998 state that age alone is not a contraindication to surgery for a wedge resection or a lobectomy in the over 80 patients [23]. The increase in number of resections between group III and I was 155 cases. As many as 82 of these cases were aged greater than 70 years at the time of surgery. If we further stratify these cases by sex, the over-70 females increased by 91% from 45 cases in group I to 86 cases in group III.

Patients treated surgically who are aged over 80 years increased from 6 to 26 cases. This represents a fourfold plus increase, and accounts for 27 of the 155 cases. The interesting change in this group is when these numbers are stratified by sex. The number of females rose by four cases, but males increased by 16 cases. It appears that once the age of 80 years is reached, males are more likely to have an operation than females.

In 1996, only 19% of all patients and only 12% of patients aged older than 75 years were discussed at an MDT. This increased to 64% in 2006 for all patients and to 58% of the over-75 patients [3]. Thoracic surgeons have been integrated in all MDTs. The active and regular participation by thoracic surgeons during assessment for treatment meetings has been identified by other authors as a major component in improving resection rates [24,25].

The survival figures for patients treated surgically in NI are improving (Fig. 5). There is still much potential for improvement, but subsequent gains may require further patient and physician education, capital investment and further reorganisation. The Regional Thoracic Unit operates on 150 primary lung cancer patients per year; however, in order to increase the resection rates to American standards with a rate of 21—25% [8], it will need to increase its throughput of lung resections to 225 per year. Currently, the unit averages 730 procedures per year overall with 20% of the current workload being primary lung cancer.

In conclusion, NI has changed the patient pathway for lung cancer patients. The concept of MDTs with active thoracic surgical input has been implemented. This referral pathway culture change has lead to an increasing number of patients being discussed at MDT meetings and, in particular, elderly patients with co-morbidities are now being discussed regularly. The decision to operate on surgically challenging patients may be improved with active surgical participation. It is this surgical element in the MDT, which has produced the increase in the number of resections in females with significant co-morbidities. Only a team of specialists with surgeons present can appropriately discuss the suitability of operative treatment of lung cancer patients.

References


Appendix A. Conference discussion

Dr F. Rea (Padova, Italy): In your paper you have outlined the importance of this multidisciplinary working team in order to improve the management of lung cancer and to increase the resection rate. You also state that the increase in resections in females is multifactorial and maybe is related to a screening program. I have two questions. What kind of screening is used for the females, and why use it only in the females and not in the males? And if there is an increase in the resection rate, is there also an increase in the overall survival in the patients operated on in the last period?

Dr Beattie: There is no set screening per se for lung cancer in Northern Ireland. What I was trying to infer is that I think women are more in tune with their bodies. With breast screening, with cervical screening, they tend to be presenting to their primary care physician earlier, they are more involved with their health care, and men seem to present a little bit later.

I’m sorry, what was the second question?

Dr Rea: Has the increase in the resection rate demonstrated an increase in overall survival in the patients with lung cancer operated on in the last period?

Dr Beattie: Yes, the survival rate has increased. The post-surgery survival rate has gone up by 3—5% in the past audit, which was in 2006.

Dr D. Waller (Leicester, United Kingdom): Our findings are similar. Antonio Martin-Ucar, who is in the audience, published a paper a few years ago. We found exactly the same in our practice in England, that the lung cancer resection rate increased since the development of multidisciplinary teams, and the reason for the increase was particularly the increase in operations in elderly females. Why do you think that is, and why do you think the resection rates for females was suboptimal at the start of your study?

Dr Beattie: From looking at the literature, one of the key things seems to be the introduction of the thoracic surgeon in particular into the multidisciplinary teams. It may have been preconceived before that an elderly female may not have the same benefit, and certainly with a thoracic surgeon, there is a more proactive approach, and they are certainly happier to say that they’re going to operate on these patients as a team, and I think that’s what is bringing the rate up.

Dr Waller: I agree with you. I think before the MDT started, the physicians just would not discuss those patients with the surgeon. They would just refer directly to the oncologist.