Bronchoscopy in octogenarians

SIR—Fiberoptic bronchoscopy (FOB) is an important diagnostic and therapeutic tool and is considered to be a safe procedure [1]. Factors that may increase the risk of FOB include the general condition of the patient, the specific procedure performed, available facilities, skills and experience of the medical personnel [1–5]. The reported frequency of complications associated with FOB varies between 0.3 and 30% [1–5], however, the definition of complications varies between studies.

There is a high prevalence of respiratory diseases in the elderly, and FOB is often indicated in these patients. Only a few studies evaluating FOB in the elderly have been reported [6–13]. Most of these studies conclude that elderly patients tolerate bronchoscopy as well as younger patients and that FOB is safe and has a high diagnostic yield. However, these studies include only a small number of patients over 80 years of age.

In the present study, we evaluate the safety, diagnostic and therapeutic yield of FOB in patients aged 80 years and older, and compare these with procedures performed in younger patients.

Methods

Two thousand nine hundred and sixty-nine FOBs were performed in adult patients at Hadassah Medical Centre between January 1997 and April 2004. The patients included both outpatients and inpatients including those on mechanical ventilation. One hundred and seventy three FOBs were performed on 150 patients 80 years or older (octogenarians). This group constituted the study population. The control group comprised 201 FOBs randomly chosen from the 2,796 procedures performed on patients aged 19–79 years (the computerised randomisation was arbitrary, using patient identification numbers). A retrospective analysis was done in both groups to evaluate the indications;

References


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type of procedure, diagnostic and therapeutic yield and rate of complications (during bronchoscopy and up to 24 h after the procedure). The mortality rate was calculated from all the 2,969 bronchoscopies done during these years.

All FOBs were performed by a certified pulmonary physician or a pulmonary fellow under the guidance of a pulmonary physician with the assistance of a specialist bronchoscopy nurse. Nasal anaesthesia was administered using 2% topical lidocaine jelly. Vocal cord and airway anaesthesia was administered using 2–4% lidocaine administered through the bronchoscope. Conscious sedation was achieved with midazolam with occasional addition of pethidine. All patients received supplemental oxygen and were monitored with pulse oxymetry, a 3-lead electrocardiogram and intermittent non-invasive blood pressure measurements. Patients on mechanical ventilation received 100% oxygen during the procedure and were sedated with midazolam or propofol. Bronchoalveolar lavage was performed by installation of 2–3 doses of 60 ml aliquots of 0.9% saline through the bronchoscope to the specific lung segment. Transbronchial biopsies (TBB) were performed using fluoroscopy guidance. Following bronchoscopy, patients were monitored for complications for 3–6 h. Routine chest X-ray was performed in all patients who underwent TBB.

Patient details were obtained by reviewing medical files and bronchoscopy reports. The information included patient gender, age, past medical history, concomitant illnesses, medications, indications for the bronchoscopy, where the bronchoscopy was performed (bronchial stricture, intensive care unit), premedication used, type of procedure performed (bronchoalveolar lavage, biopsies etc.), findings with bronchoscopy, complications, diagnostic and therapeutic yield and final diagnosis. Complications were defined by the pulmonologist responsible for the procedure during the bronchoscopy, or shortly after the bronchoscopy. Chi-square analysis was performed to identify differences between the groups.

Results

Patients

One hundred and seventy three FOBs were performed in 150 patients 80 years of age or older. Mean patient age was 84.9 ± 3.3 years (range 80–101 years). Ninety-eight procedures were performed on patients 80 years of age or older. Mean patient age was 84.9 ± 14.6 years. The proportion of complications (during bronchoscopy and up to 24 h after the procedure). The mortality rate was calculated from all the bronchoscopies done during these years.

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Results

Patients

One hundred and seventy three FOBs were performed in 150 patients 80 years of age or older. Mean patient age was 84.9 ± 3.3 years (range 80–101 years). Ninety-eight procedures were performed in men (57%) and 75 in women (43%). The mean age in the control group was 53.2 ± 14.6 years. The proportion between the genders was similar—59% in men and 41% in women (Table 1). We found no differences between the groups in the prevalence of ischaemic heart disease, diabetes mellitus, hypertension, malignancy or chronic lung disease. The study group included one immunosuppressed patient and the control group included 19 immunosuppressed patients (P<0.05).

Indications and procedures

The most frequent indications for bronchoscopy in both groups were suspected infection and suspected tumour. The number of bronchoscopies done on patients on mechanical ventilation was higher in the octogenarian group (35%), compared to the control group (25%) (P = 0.03). The rate of endobronchial biopsy was similar between the groups—29% in octogenarians and 27% in the control group. TBB was performed in 18% of the octogenarians as compared to 30% in the control group (P = 0.006).

Diagnosis

The final diagnoses in octogenarians were similar to that found in the control group (Table 1). The diagnostic yield of bronchoscopy was 63% in octogenarians and 52% in the control group (P = 0.04). The combination of diagnostic and therapeutic benefit was 88% in the octogenarians and 87% in the control group.

Complications

The frequency of complications and the mortality rate were significantly higher in octogenarians (Table 2). Twenty patients had 26 complications in the octogenarian group compared to 11 patients and 13 complications in the control group (11.5% versus 5.5% P = 0.04). The difference is even more significant considering the lower rate of TBBs performed in octogenarians and the difference in immunosuppressed patients. Complications included hypoxaemia (deterioration of saturation below 90%), bleeding, pneumothorax, arrhythmia, hypotension, bronchospasm, stridor and fever. Frequency of bleeding was similar in the two groups (4% versus 3.5% in controls), but the rate of other complications was higher in octogenarians as compared to the control group. The main difference was in hypoxaemia—6.3% in octogenarians and 1.5% in the control group (P = 0.03, Table 2). The mortality rate was calculated from all the bronchoscopies done during these years.

Table 1. Patient groups and final diagnosis

<table>
<thead>
<tr>
<th>Age</th>
<th>Octogenarians</th>
<th>Young patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males/females (%)</td>
<td>57/43</td>
<td>59/41</td>
</tr>
<tr>
<td>Endobronchial biopsies (%)</td>
<td>29</td>
<td>27</td>
</tr>
<tr>
<td>Transbronchial biopsies (%)</td>
<td>18*</td>
<td>30*</td>
</tr>
<tr>
<td>Diagnostic yield (%)</td>
<td>63*</td>
<td>52**</td>
</tr>
<tr>
<td>Diagnostic + therapeutic yield (%)</td>
<td>88</td>
<td>87</td>
</tr>
<tr>
<td>Infection (%)</td>
<td>40</td>
<td>36</td>
</tr>
<tr>
<td>Tumour (%)</td>
<td>22.5</td>
<td>22</td>
</tr>
<tr>
<td>Inflammatory disease (%)</td>
<td>22</td>
<td>15.5</td>
</tr>
<tr>
<td>Intestinal lung disease (%)</td>
<td>1</td>
<td>7</td>
</tr>
</tbody>
</table>

* P<0.006.
** P = 0.04.
*** Foreign body, focal bleeding, tracheomalacia, fistula, vocal cord abnormality, normal.
Research letters

Table 2. Complications and mortality (values are percentages)

<table>
<thead>
<tr>
<th>Complications</th>
<th>Octogenarians</th>
<th>Young patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bleeding (%)</td>
<td>4</td>
<td>3.5</td>
</tr>
<tr>
<td>Hypoxaemia (%)</td>
<td>6.3**</td>
<td>1.5*</td>
</tr>
<tr>
<td>Pneumothorax (%)</td>
<td>1.2 (6.3% of TBB)</td>
<td>0.5 (1.7% of TBB)</td>
</tr>
<tr>
<td>Fever (%)</td>
<td>0.6</td>
<td>0</td>
</tr>
<tr>
<td>Arrhythmia (%)</td>
<td>1.7</td>
<td>0</td>
</tr>
<tr>
<td>Hypotension (%)</td>
<td>0.6</td>
<td>0</td>
</tr>
<tr>
<td>Bronchospasm (%)</td>
<td>0.6</td>
<td>0</td>
</tr>
<tr>
<td>Complications (%)</td>
<td>11.5**</td>
<td>5.5***</td>
</tr>
<tr>
<td>Mortality (%)</td>
<td>1.2***</td>
<td>0.035***</td>
</tr>
</tbody>
</table>

* P = 0.03
** P = 0.04
*** P = 0.001.

years. Two patients in the octogenarian group died (1.2%). The death rate in patients aged 18–79 years was 1/2,796 (0.035%). The difference reached statistical significance (P = 0.001). The young patient and one of the old patients who died were on mechanical ventilation at the time of bronchoscopy.

Discussion

In this retrospective study, we evaluated the use of FOB in patients 80 years of age and older. To our knowledge, this is the largest cohort of patients reported in this age group. Our study also included patients on mechanical ventilation (35% in the octogenarian group and 25% in the control group). The large number of patients on mechanical ventilation relates to the fact that the study was performed in a tertiary centre. Indications for FOB, diagnostic and therapeutic yields and the final diagnosis in octogenarians were similar to those observed in younger patients. These findings are comparable to those observed in previous studies done on elderly patients [6–13].

In our study, the frequency of complications (11.5%) and mortality rate (1.2%) were significantly higher in octogenarians as compared to the control group. This is in contrast to the study of Allan and Ouellette who reported a complication rate of only 3.3% (similar to those in younger patients) with no deaths among 120 bronchoscopies performed in octogenarians [12]. The difference between this study and our study may be related to the different cohort of patients; Allan’s study included army veterans, with a mean age of 82.8 years, and they excluded patients on mechanical ventilation. In our study, patients were slightly older (84.9 ± 3.3 years) and included a high percentage of patients on mechanical ventilation. However, we found no difference in the frequency of complications between ventilated and non-ventilated patients.

In the study of Hehn et al., the authors reviewed 1,359 FOB of which only 30 procedures were performed on patients 80 years of age or older [13]. They found a 33% incidence of adverse events, which was significantly higher than that observed in younger patients (10%). As in our study, they found that hypoxaemia was the most frequent adverse event in octogenarians (13.3%). The rate of complications in this study was higher than in our study (33% compared to 11.5%), and in all likelihood, this difference relates to differences in definitions of complications. The authors conclude that there is an increased risk for adverse events with increasing age; most of the complications are minor, suggesting that chronological age should not be a contraindication for bronchoscopy in older patients.

In our study, we also found that most of the complications were minor, however, we cannot discount the higher complication rate and mortality observed in octogenarians in a procedure considered to be very safe. Nevertheless, the difference is even more significant considering the lower rate of TBBs performed in octogenarians, and the lower rate of immunosuppressed patients among octogenarians. It is possible that the main factor accounting for the difference in complications is the severity of coexistent illness in octogenarians rather than age per se. Our study was performed retrospectively, and we could not, therefore, evaluate the severity of the diseases. Two of the three deaths were in ventilated patients. It is possible that the basic critical situation contributed to the death, rather than age per se. A large prospective study is needed to confirm our findings.

Key points

- In octogenarians, indications for FOB, final diagnosis, diagnostic yield and therapeutic benefit were similar to that observed in younger patients.
- Bronchoscopy in octogenarians provides a high diagnostic and therapeutic benefit, but is associated with a higher morbidity rate than that observed in younger patients.

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Conflict of interest

The authors have no conflict of interest regarding this work.

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