The Fatality-Prone Asthmatic Patient*
Follow-up Study after Near-Fatal Attacks

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We studied 12 fatality-prone patients for 18 months after they had been discharged from the hospital following life-threatening exacerbations of asthma (mean PaCO₂ on admission, 97 mm Hg). Our objectives were (1) to evaluate the natural history of their disease during ambulatory care and (2) to investigate whether close follow-up might help to avert further near-fatal events. Only seven of the 12 patients consented to be enrolled in the study, which included monthly scheduled visits to the hospital and monthly telephone calls to record emergency room visits and changes in therapy. By the conclusion of the 18-month follow-up period, two of the noncompliant patients had died during asthmatic attacks. By contrast, all of the seven who had agreed to participate survived; one required intubation and mechanical ventilation, and the other six required occasional unscheduled emergency room visits because of acute exacerbations. Specific precipitants could not be determined, and the most common cause of the acute episodes was likely inadequate steroid therapy. The results suggest that compliance with adequate antiasthmatic therapy and close follow-up may be important in the prevention of near-fatal events.

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METHODS

Subjects

Between October 1986 and October 1987, 12 patients who had experienced a total of 15 episodes of respiratory arrest were admitted to Hospital Nacional Maria Ferrer, in Buenos Aires, Argentina. After hospital discharge, until April 1989, all were followed up prospectively. The diagnosis of asthma was based on the American Thoracic Society criteria. Details of their near-fatal episodes were the subject of another report. A summary of the relevant data obtained on their first admission is shown in Table 1.

One patient (patient 9) refused to continue attending our hospital, and five others (patients 8 to 12) did not agree to be enrolled in the study but continued to attend their physicians’ offices and the emergency room as they saw fit. The remaining seven consented to the follow-up design.

Follow-up Design

The follow-up protocol comprised: (1) a monthly scheduled visit to the outpatient facility at the hospital, regardless of the number of scheduled visits to their personal physicians or unscheduled visits to the emergency room; and (2) a monthly telephone call to each patient to record the number of emergency visits and changes in antiasthmatic therapy.

Markers of Severity

Three major markers of severity were selected: (1) number of admissions to any hospital for treatment of asthma; (2) number of visits to the emergency room of any hospital; and (3) medications needed to control asthma symptoms.

RESULTS

When the follow-up protocol was started, both groups had similar baseline characteristics (Table 1). However, the noncompliant patients tended to have a longer duration of symptoms prior to arrival at the hospital, although, because of the large variation and the small numbers, this difference was not statistically significant.

Results regarding the markers of severity for the seven patients who received close follow-up are shown...
in Table 2. Patient 5 was ventilated after 6 h of
conventional in-hospital treatment 17 months after
initial presentation. During the 18 months of the study,
six patients received oral theophylline (600 mg/24 h)
and beclomethasone (300 to 400 µg/24 h); all patients
received inhaled β2-agonists on a regular basis (five
salbutamol and two fenoterol), and upon discharge
from initial presentation, all were given oral cortico-
steroids at a starting dose of 40 mg, with a tapering
regimen of 5 mg/wk. On every emergency visit, the
prednisone dose was increased to 40 mg, and the
tapering regimen was repeated as described above.

Results from the five subjects who did not enter the
study were obtained from chart review. During the
18-month follow-up period, patient 8 was admitted to

Table 2—Results from the Complete Follow-up
in Compliant Patients*  

<table>
<thead>
<tr>
<th>Patient</th>
<th>No. of Room Visits</th>
<th>Readmission</th>
<th>MV</th>
<th>Death</th>
<th>Treatment</th>
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<tr>
<td>1</td>
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<td>No</td>
<td>No</td>
<td>T,S,B,P</td>
</tr>
<tr>
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<td>2</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>T,S,B</td>
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<tr>
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<td>1</td>
<td>No</td>
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<td>T,S,B</td>
</tr>
<tr>
<td>4</td>
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<td>No</td>
<td>No</td>
<td>No</td>
<td>T,F,P</td>
</tr>
<tr>
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</tr>
</tbody>
</table>

*MV = mechanical ventilation; T = theophylline; S = salbutamol;
B = beclomethasone; F = fenoterol; P = prednisone (20-40 mg/24 h).

our hospital following cardiac and respiratory arrest
five months after discharge. This patient was declared
brain dead, and she later died in the ICU. According
to her relatives, she had delayed requesting medical
help. Four months after discharge, patient 9 had a
severe asthmatic attack, reached another hospital
unconscious, and subsequently died having sustained
severe barotrauma following mechanical ventilation.
Telephone calls to her mother and to the hospital
confirmed that she had arrived in a state of respiratory
arrest and that mechanical ventilation was complicated
by bilateral pneumothoraces. Subjects 10, 11, and 12
continued to attend the hospital.

DISCUSSION

The purpose of the present study was to track the
outcomes of asthmatic patients at high risk for develop-
ing fatal exacerbations of their asthma. All of the
patients had a number of characteristics that have
previously been identified as indicating high risk for
fatal asthma.1-3,8,15-18 These characteristics included
long-lasting disease in young individuals who had been
admitted within the previous year because of life-
threatening attacks and who had experienced frequent
visits to the emergency department.

Once the factors leading to worsening of asthma
have been identified, how can further near-fatal or
fatal attacks be prevented?19 In this context, the main
finding of our study was that the patients who agreed
with and complied with close follow-up fared better
than the patients who did not receive close supervi-

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sion. In the 18-month period, two of the five patients who did not comply with follow-up died, likely due to their asthma. By contrast, during the 18-month follow-up period, none of the seven compliant patients died, and only one required mechanical ventilation after many hours of conventional in-hospital therapy.

The fact that many relapses were related to discontinuation of oral steroid therapy strengthens the argument that their use may be mandatory in preventing relapses. However, short courses of oral corticosteroids may be useful only during the period when they are being taken, relapses occurring at the same rate as in non-steroid-treated patients after the course is completed. 20 In this regard, our patients received relatively low doses of beclomethasone following the short courses of oral steroids. Given the current trend of using higher doses of inhaled steroids, 21 it is possible that, in our patients, the number of acute exacerbations and the need for oral steroids might have been reduced. In addition, although the evidence for the home monitoring of peak flow in patients with asthma of this severity is not yet conclusive, reports now strongly suggest that it might be beneficial for the management of asthma. 21,22

The study design we used was not randomized. For ethical reasons, we could not justify forming a control group for whom we would deny close follow-up. Our “control” group was clearly a biased one, consisting of patients who refused the close follow-up that was offered. It is likely that the group who did not agree to follow-up were also less compliant with their medications and would be more likely to delay seeking definitive medical care when their asthma was out of control. We observed a trend for this noncompliant group to have a longer duration of symptoms (median, 72 h) prior to seeking medical attention than the compliant group (median, 7 h).

Despite this unavoidable bias and the small number of subjects followed up, a group at extremely high risk of mortality from their asthma has been identified. Patients with life-threatening respiratory failure secondary to their asthma who subsequently refuse very close follow-up are, not surprisingly, at very high risk of mortality from their asthma over a follow-up period as short as 18 months. Plans are now to develop better strategies for following up patients who refuse follow-up. In addition to rapid admission services, such strategies might include greater involvement of the patients’ families, education of patients, and home visits on a regular basis by medical personnel. In essence, the problem for health-care providers is to deal with the paradox of developing even closer follow-up strategies for patients who refuse follow-up. It is possible that knowledge of the extremely high mortality in fatality-prone asthmatic patients who refuse close follow-up may prompt some patients to comply more fully with adequate medical supervision.

It is likely that a reasonable approach is to pursue three strategies simultaneously: close follow-up, high doses of inhaled anti-inflammatory agents, and peak flow monitoring. However, provided that other barriers (eg, socioeconomic) are not present, compliance of the patients with all of these strategies may be the fundamental underlying factor.

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