

Timing of discharge from hospital of patients admitted with asthma: a district general hospital experience

ABSTRACT—How soon can one safely discharge patients admitted to hospital with an exacerbation of asthma? Criteria for discharge were published by the British Thoracic Society in 1990 and revised in 1993. We have reviewed a cohort of patients with asthma discharged over a 12-month period from a busy district general hospital. Most patients were discharged without meeting all the BTS criteria. Outcome measures suggest that this may not matter at least in patients who have received education from a specialist chest liaison nurse and were discharged on oral and inhaled steroids.

Exacerbations of asthma are a frequent cause of admission to hospital and therefore length of stay has important implications for hospital resources. It is not known how early patients may be safely discharged. Guidelines published by the British Thoracic Society (BTS) in October 1990 [1] suggested that patients should not normally be discharged until their symptoms have cleared and lung function has stabilised or returned to its normal or best level, recognised by a peak expiratory flow greater than 75% of the predicted or their best level, a diurnal variability of less than 25% and no nocturnal symptoms.

The guidelines were modified by the BTS in 1993 [2] when it was suggested that if the above criteria were not met the patients could be discharged with the agreement and support of their general practitioner and respiratory physician, provided that they were responding well and could be relied on to comply with treatment; they should also take 30 mg a day of prednisolone until their peak flow was greater than 75% of the best value for several consecutive days and diurnal variation was less than 25%.

We have reviewed a cohort of 75 patients admitted with an exacerbation of asthma to see how closely the

BTS guidelines are being followed in our district general hospital and how failure to follow them affects the patients' health after discharge.

Patients and methods

Our chest liaison nurse collected data on patients who were admitted with asthma to our general medical wards between 1 April 1991 and 1 April 1992.

The patients had been referred to our specialist nurse by the four general medical firms under which they had been admitted. Only one firm included a physician with a special interest in respiratory medicine. Firms were encouraged to ask the chest nurse to see all patients admitted with asthma and in particular those whose management might cause problems. The nurse saw the patients at least once during the admission and spent time discussing such topics as the differences between relief and prevention therapy and the importance of inflammation of the airways in asthma. She also checked and taught inhaler technique.

Seventy-five patients were asked to complete a diary card while in hospital and for 14 days after discharge, recording night symptoms (wheeze and cough), thrice daily peak flow readings (taken before using inhalers) and medication. At the end of 14 days they were asked to return the diary card and complete a questionnaire (Table 1).

All patients' general practitioners received a questionnaire asking for details of their patients' progress during the two months following discharge (Table 2). All general practitioners returned the questionnaires.

The decision as to when to discharge the patient, and on what therapy, was taken by the medical firm looking after the patient, without consulting the general practitioner.

All patients were prescribed an inhaled steroid (dose range 400–2,000 micrograms a day; mean 1,580 micrograms) and all but one also took oral steroids.

Patients' notes were checked for (a) re-admission to hospital within two months and between two months and one year of discharge, and (b) a record of the patients' best ever peak flow at the time of admission.

How many of the BTS guidelines criteria had been met at the time of discharge was estimated from the diary cards and, if not met, how many days after discharge it took to achieve them. No patient in this study has died of asthma at the time of writing this report.

T J WILLIAMS, FRCP
Consultant Physician

J SPENCER, RGN, RM
Chest Liaison Nurse

T FAHEY, MSc, MRCGP
Senior Registrar in Public Health Medicine

L HARRIS, MSc, MFPHM
Consultant in Public Health Medicine
Kettering and District General Hospital

Table 1. Patient questionnaire to be returned 14 days after discharge

When you were sent home from hospital do you think:

- it was about the right time?
- you were sent home too early?
- you were kept in too long?
- don't know.

Have you had to come up to the hospital emergency department because of your asthma over the past two weeks? Yes/No.

Have you had to call out your GP or make an urgent appointment to see him or her because of your asthma in the past two weeks? Yes/No.

Since your discharge have you been able to return to the same levels of activity as you had before this admission? Yes/No/Don't know.

Table 2. General practitioner questionnaire

During the two months following your patients' discharge with asthma (dates given):

Did they see you with a deterioration in their asthma which required you to increase or add to their asthma treatment? Yes/No.

Did you treat them as an emergency with a nebuliser? Yes/No.

Were you or your partners called out to see them as an emergency at home? Yes/No.

Did they go as an emergency to casualty because of their asthma? Yes/No.

Patient details were analysed using the EPI INFO statistical package [3]. χ^2 tests for categorical variables were computed, and Fischer exact tests applied where appropriate.

Results

Fifty-five patients (71%) returned the diary card and questionnaire but in 12 details of the treatment taken were incomplete. These 55 patients are referred to as Group A and the other 20 as Group B (Table 3).

Group A

A best ever peak flow was recorded in the notes of only 13 patients. Therefore the analysis was based on the predicted peak flow.

Only three patients met all three of the 1990 BTS guideline criteria, ie peak flow greater than 75% of predicted peak flow, diurnal variation less than 25% and no nocturnal symptoms on discharge. Twenty patients met two out of three of these criteria, 26 one and 6 none at the time of discharge.

Table 4 summarises outcome measures for patients in these different categories.

Because there were not enough patients for statistical analysis in each of the four categories, they were combined into those who had reached two or more of the criteria and those who had reached one or none.

There was no statistically significant difference in any outcome measure except a trend for more patients who had met two or three of the criteria at the time of discharge to return to their previous level of activity within two weeks ($p = 0.034$).

Based on the patients' own questionnaires, 42 thought they had been discharged at about the right time, two too early and two too late. The rest were uncertain.

Table 3. Patient details

	Group A	Group B
Total	55	20
Men	10 (18%)	8 (40%)
Women	45 (82%)	12 (60%)
Age: Mean	36	28
Median	34	22
Range	13-67	13-57
Length of stay: Mean (\pm SD)	5 (3.37)	5 (3.32)
Median	5	4
Range	1-17	1-16

Table 4. Outcome measures

	Group A patients				Group B patients
	Number of BTS criteria met at discharge				
	Three	Two	One	None	
Total patients	3	20	26	6	20
Re-admitted within two months	1	2	1	0	2
Re-admitted between two months and a year	1	7	7	1	6
Accident & emergency department visit within two weeks	0	0	0	0	0
Accident & emergency department visit within two months	1	2	0	0	1
Urgent GP appointment within two weeks	0	1	2	0	2
Returned to previous level of activity within two weeks:					
Yes	2	16	16	4	Not
Don't know	1	4	2	1	known
GP needed to increase or add to treatment within two months	1	4	5	1	4
Emergency visit at home by GP required within two months	1	1	1	1	0
Emergency nebuliser treatment by GP	0	1	1	0	0

Table 5 shows how many days after discharge patients first reached each and all three of the BTS criteria.

For the three patients who met all the criteria at the time of discharge the length of stay was two, three and five days. Length of stay data for all the other patients are given in Table 3.

Group B

As these patients did not return the diary cards it was not possible to analyse how many of the 1990 BTS criteria had been reached at the time of discharge.

Outcome measures are shown in Table 4 and are similar to those for Group A patients.

Discussion

In our district general hospital, when different medical teams made the decision on clinical grounds to

discharge patients after an acute asthmatic episode only three of a cohort of 55 patients met all three criteria proposed in 1990 by the British Thoracic Society, and six patients were discharged without meeting even one of them.

Diary cards completed at home showed that it took on average four days after discharge for patients to reach all three criteria, and 17 out of 52 patients had still not met all three criteria within two weeks; 15 of them had failed to reach a peak flow greater than 75% of that predicted within 14 days of discharge. In only three of the 15 was the best ever peak flow recorded in the notes; two of them had achieved greater than 75% of the best peak flow at the time of discharge and the third achieved it six days later. Had the best ever peak flow been known for all patients it is likely that many more might have reached that level within 14 days of discharge. However, six patients still had nocturnal symptoms 14 days after discharge.

We do not know whether the criteria would have

Table 5. Days after discharge to meet BTS guideline criteria

	Patient numbers *	Range	Mean	Not reached in 14 days
Diurnal variation less than 25%	19	1-6	2.0	0
Peak flow greater than 75% of predicted	36	1-14	4.9	15
No night symptoms	35	1-7	3.3	6
All three criteria met	52	1-14	4.3	17

*Refers to patients who at the time of discharge had not achieved the suggested criterion.

been met sooner had the patients been kept in hospital. It is possible that returning to the home environment re-exposed the patients to some allergen or other factors which may have delayed their recovery.

Keeping patients in hospital an extra four days would nearly double the average length of stay and put further pressure on the already hard-pressed medical beds. Also, as most patients thought they were discharged at about the right time, it might be difficult to persuade them to stay in hospital for another four days or so.

The number of patients who had met all three criteria was too small to assess whether they did better after discharge than those who had not met the criteria. The results of this study do not support the hypothesis that the number of criteria met would correlate with outcome measures. There was a tendency for patients who had met more of the criteria to be more likely to have returned to their previous level of activity within two weeks.

Diurnal variation at discharge has been suggested as a predictor of re-admission within two months [4-6], but it is not clear if keeping such patients longer in hospital would prevent re-admission. In our study only four Group A patients (7%) were re-admitted within two months: one had a diurnal variation on discharge of less than 25%; two achieved this diurnal variation one day after discharge, and the last reached it four days after discharge. All four patients had previous admissions with asthma and two had brittle asthma which had resulted in multiple admissions. Two of the Group B patients were re-admitted within two months; one of them had a diurnal variation of less than 25% at discharge, and for the other there was no record.

Udwadia and Harrison [4] reported a relationship between diurnal variation of peak flow during the 24 hours before discharge, and dips in peak flows and re-admission to hospital in the next eight weeks. There is, however, no evidence that keeping patients longer in hospital would have been beneficial. Their patients probably stayed in hospital longer than ours because they kept them there until their symptoms had resolved and peak flows had returned to normal. Despite this, four of their 30 patients were re-admitted within two months.

Our data do not allow us to draw conclusions concerning the modifications to guidelines made in 1993, as the general practitioner was not consulted about the timing of discharge nor was a chest physician consulted about patients who were not already under his care.

We did not specifically measure the effect on the patients of being seen by our chest liaison nurse. We thought it impractical to allocate patients to her at random as patients, nurses and junior medical staff move

freely between all three adjacent medical wards. However, all patients were discharged on inhaled steroids, usually at high dose, and all but one on oral steroids, while in the BTS asthma audit [6] 7% of patients were discharged on neither oral nor inhaled steroids. This difference may reflect her influence, particularly when discussing the patients' management with junior medical staff; there was also a tendency for fewer patients to be re-admitted in our study than in the BTS asthma audit. A recent Australian study also showed fewer re-admissions of patients who had received education about their asthma [7].

Conclusion

Patients admitted with asthma to a district general hospital are rarely kept in hospital long enough to meet all the suggested BTS criteria. Outcome measures indicate that this may not matter, at least in patients who have received education from a specialist chest liaison nurse and are discharged on oral and inhaled steroids.

Acknowledgements

We thank Mrs Helen James for typing the manuscript, and the many general practitioners who kindly completed questionnaires.

References

- 1 Statement by the British Thoracic Society, Research Unit of the Royal College of Physicians of London, King's Fund Centre, National Asthma Campaign. Guidelines for management of asthma in adults. II: Acute severe asthma. *Br Med J* 1990;**301**: 797-800.
- 2 Guidelines on the management of asthma. *Thorax* 1993;**48**: S1-24.
- 3 Dean AD, Dean JA, Burton JH, Dicker RC. EPI INFO, version 5: A word processing, database and statistics programme for epidemiology on microcomputers. Atlanta, Georgia, USA; Centres for Disease Control, 1990.
- 4 Udwadia ZF, Harrison BDW. An attempt to determine the optimal duration of hospital stay following a severe attack of asthma. *J R Coll Physicians Lond* 1990;**24**:112-4.
- 5 Bucknell CE, Robertson C, Moran F, Stevenson RD. Why un-critical criterion based audit is not enough: analysis of PEFr data from a prospective asthma audit. *Thorax* 1992;**47**:884.
- 6 Pearson MG, Ryland I, Rudolf M, Harrison BDW. Discharge and follow up of acute asthma. *Thorax* 1992;**47**:209P.
- 7 Yoon R, McKenzie DK, Bauman A, Miles DA. Controlled trial evaluation of an asthma education programme for adults. *Thorax* 1993;**48**:1110-6.

Address for correspondence: Dr T J Williams, Kettering and District General Hospital, Rothwell Road, Kettering, Northamptonshire NN16 8UZ.