A criterion based audit of inpatient asthma care

Closing the feedback loop

ABSTRACT—We have assessed the care of patients admitted to a specialist respiratory medical ward acutely ill with asthma, using a criterion based audit derived from a standard management protocol already in use in our hospitals. The audit was first performed from 01.01.90 to 31.08.90; after implementing certain changes, the audit was repeated from 1.12.90 to 31.1.91. Special attention was paid in each audit review to pre-admission measures, inpatient management and pre-discharge and follow-up management. During both audit periods, of a total of 78 patients, 74 patients gave a reason for the worsening of their asthma; 59 had had PEF measured and 58 had received systemic steroids before admission; 77 patients had full objective assessment of severity on admission; 76 patients were discharged on oral steroids; 62 had PEF meters for home monitoring; and 65 of the 68 patients who lived in our district were seen again within six weeks as outpatients in the chest clinic. However, only 30/55 (54%) had PEF variability of 20% or less (our criterion for appropriateness of discharge, in the first audit period) and only 32/55 had a written check on their inhaler technique in the first audit period. By relaxing our PEF criterion for discharge (in line with national guidelines), by introducing a stamp for recording that inhaler technique had been checked, and with encouragement and exhortation from senior staff, we improved our performance of meeting the set standards to 17 of 23 (74%) patients for PEF variability and to 22 of 23 (96%) patients for written check on inhaler technique in the second audit period. Staff were gratified and rewarded by those aspects of patient management which the audit revealed to be of good quality. The problems highlighted during the first audit led to corrective action, and improvement in our practice was confirmed by the second audit.

Several studies have shown that the care of severely ill asthmatic patients admitted to hospital is better on wards or teams that include a specialist chest physician than on those without such a specialist [1–4]. Asthma is perhaps the commonest chronic disease in Britain; it affects all ages and its morbidity and mortality remain unacceptably high [5–8]. It is the commonest cause of acute admission to our respiratory medical ward. For all these reasons we chose it as our first condition for medical audit.

A protocol for the recognition and management of severe asthmatic attacks in adults has been in use in our district hospitals for the past twelve years. We have used this protocol for thirteen months from January 1990 to conduct a criterion based audit of inpatient care of asthmatics admitted to our respiratory medical ward. Our aim was to determine to what extent our practice measured up to the recommendations in the protocol. When we discovered defects in our management of asthma we implemented changes and reassessed our performance.

Method

The study took place in our respiratory medical ward at the West Norwich Hospital between 01.01.90 and 31.08.90, and from 01.12.90 to 31.01.91. Our management protocol defines an acute asthmatic attack on the basis of symptoms, signs and clinical measurements. For an attack to be defined as ‘severe’, at least two of the abnormalities in signs or measurements have to be present (Fig. 1). The protocol then outlines steps to be taken in the management of an acute severe asthmatic attack (Fig. 2). Our criteria were chosen so that we could audit objective assessment and treatement before admission; objective assessment on

Fig. 1. Protocol for managing severe asthma—list of symptoms, signs and measurements used to define a severe attack.

| Symptoms |
|----------|
| 1. Patient unable to get up from chair or bed. |
| 2. Patient unable to complete sentences in one breath. |

| Signs |
|-------|
| 1. Tachycardia – heart rate ≥ 110/min. |
| 2. Systolic paradox ≥ 10mm Hg. |
| 3. Tachypnoea – respiratory rate ≥ 28/min. |
| 4. A silent chest, cyanosis or signs of respiratory muscle fatigue each indicates a very severe attack. |

| Measurement |
|------------|
| 1. Peak expiratory flow < 30% of predicted normal. |
| 2. Arterial PCO₂ which is normal (in an ill patient) or high. |

K. L. LIM, MB, MRCP, Medical Registrar
B. D. W. HARRISON, MB, FRCP,
Consultant Physician, Department of Respiratory Medicine, West Norwich Hospital, Norwich
admission and airway lability before discharge; and various aspects of the patient's management before and after discharge from hospital.

In January 1990, we introduced a proforma to act as a history taking sheet for the house physicians, as a format for summaries for the middle grade doctors, and to enable us to audit asthma care. The three pages of the proforma have been reproduced in Fig. 3.

The history of the present attack, drug treatment before admission and the medical and social histories are recorded on the first page (Fig. 3a). From this we audited:

1. Reason for deterioration of asthma.
2. Peak flow (PEF) measurement before admission.
3. Steroids started by general practitioners (GP) or casualty doctors.

The second page (Fig. 3b) records inpatient treatment and progress, and we audited:

4. Objective assessment of severity on admission, which had to include heart rate, systolic paradox, respiratory rate, PEF and arterial blood gases to be complete.

5. PEF variability in the 24 hours pre-discharge.

The last page (Fig. 3c) documents patient education and follow-up arrangements, and from this we audited four aspects of patient care:

6. Written check on inhaler technique.
7. Oral steroids on discharge.
8. PEF meter for home monitoring.
9. Follow-up appointment.

The audits were conducted at the end of a weekly ward round in January and February 1990 and then at two-monthly intervals in April, June and August. As a result of the June and August audits we introduced some changes and then conducted an audit of the preceding two months at the end of January. The data were collected manually by the clinical team (consultant, consultant's secretary, registrar, SHO, two house physicians and senior trained nurse).

**Fig. 2.** Protocol for managing severe asthma—treatment and monitoring of response.

**Fig. 3.** History/summary proforma: (a) page 1; (b) page 2; (c) page 3.
Results (see Table 1)

There were 78 acute asthmatic admissions between 01.01.90 and 31.08.90 and 01.12.90 and 31.01.91 under one consultant chest physician. None required admission to, or transfer to, the ITU.

Pre-admission

There were no differences between the two study periods for any of the 'pre-admission' audit measures. For the two periods combined, 74 patients gave a reason for the worsening of their asthma. PEF had been measured in 59, and 58 had injections of steroids before admission.

Inpatient care

A complete objective assessment of the severity of their asthmatic attack was made in 77 patients. Arterial blood was sampled in all except one 12-year-old boy. In the first audit period, 30 patients had achieved PEF variabilities of 20% or less in the 24 hours preceding discharge from hospital [9] (Fig. 4). There was marked improvement in PEF variability in patients admitted during February after the January audit, but this was followed by progressive deterioration in patients admitted after February through to August. Following the publication of national guidelines [10], the standard was changed to a variability of 25% or less and house physicians were asked to record the reasons for discharge if this criterion had not been met. Between 01.12.90 and 31.01.91, the PEF varied by 25% or less in 17 of the 23 patients during the 24 hours before discharge, and in another three patients the reasons why the patient had been discharged before this criterion had been met were recorded in the notes by the house physician.

Pre-discharge

The fluctuations in written checks on inhaler technique are also shown in Fig. 4. After the audit at the end of June we introduced a rubber stamp for use on the patient's PEF chart which required the signature of the trained nurse or doctor who had checked that patient's inhaler technique. This, plus encouragement from senior staff, resulted in much better check of inhaler technique, such that in the December/January period this criterion was satisfied in 22 of the 23 patients.

All but two patients were discharged on oral
steroids. These two not been severely ill on admission and did not receive systemic steroid treatment. Sixty-two patients had PEF meters for monitoring their asthma at home and 46 patients were reassessed by us within four weeks of discharge from hospital. Another 19 patients were seen within six weeks, and 10 patients who were visitors to the county were asked to report to their local GP on returning home. Three non-compliant patients did not attend or were not given routine follow-up appointments.

Discussion

Most of the patients with an acute attack of asthma were admitted directly to our ward by their GP. A few were admitted from the A & E department or admitted themselves directly. Three-quarters of patients had PEF measured and received systemic steroids before their hospital admission, reflecting the high quality of general practice in this district.

As we should expect on a dedicated specialist respiratory medical ward, assessment of the severity of the asthma on admission was almost complete, but nevertheless this finding was very gratifying.

To our surprise, only 55% of patients fulfilled our criterion for PEF variability on discharge in the first eight months of the audit. There were probably three reasons for this. First, the criterion, though suggested by an earlier study [9], was too strict. When we relaxed it following the publication of national guidelines [10] we achieved a much better result. A second reason is the pressure put on doctors for an early discharge by patients who are visitors or holidaymakers. This group comprised 13% of our patients. Third, this district is short of general medical beds; our ward has the highest throughput per bed of any of our general medical wards and there is continual pressure on doctors and nurses to make beds available for further emergency admissions.

The recording of inhaler technique checks was also poor during the months from March to June when the ward experiences an annual increase in asthma admissions. In an attempt to overcome this problem, a rubber stamp was introduced and used on all PEF charts at the end of patients’ beds. The house physician or trained nurse then had to record checks on inhaler technique before each patient was discharged. This, plus encouragement from senior staff, led to a marked improvement in recording that the checks had been made.
Conclusion

This audit has had three results. First, staff were pleased when we discovered how well patients were assessed on admission and how many were discharged on oral steroids. Second, the audit highlighted problems with our peak flow criterion for discharge and with the recording in the notes of inhaler technique checks. By modifying our peak flow criterion, by introducing a rubber stamp and by continued exhortation from senior staff, we were able to improve our performance of both criteria. Third, we had thus shown we had been able to close the audit feedback loop [11].

Our data were collected manually but computerisation would make the data easily accessible. We had no audit clerks in Norwich during this survey but such a criterion based audit could certainly have been performed by a trained clerk.

The simple framework evaluated in this study could be used to evaluate clinical practices in any medical condition in any medical specialty on a specialist or a general medical ward or firm.

References

1 Osman J, Ormerod LP, Stableforth DE. Management of acute asthma: a survey of hospital practice and comparison between thoracic and general physicians in Birmingham and Manchester. Br J Dis Chest 1987;81:232-41.

2 Bucknall CE, Robertson C, Moran F, Stevenson RD. Differences in hospital asthma management. Lancet 1988;i:748–50.

3 Baldwin DR, Ormerod LP, Mackay AD, Stableforth DE. Changes in hospital management of acute severe asthma by thoracic and general physicians in Birmingham and Manchester during 1978 and 1985. Thorax 1990;45:130–4.

4 Bell D, Layton AJ, Gabbay J. Use of a guideline based questionnaire to audit hospital care of acute asthma. Br Med J 1991;302:1440–3.

5 British Thoracic Association. Death from asthma in two regions of England. Br Med J 1982;285:1251–5.

6 Eason J, Markowe HJ. Controlled investigation of deaths from asthma in hospitals in the North East Thames region. Br Med J 1987;294:1255–8.

7 Turner-Warwick M. Nocturnal asthma: a study in general practice. J R Coll Gen Pract 1989;39:239–43.

8 Royal College of General Practitioners, Office of Population Censuses and Surveys, and Department of Health and Social Security. Morbidity statistics from general practice 1981–82. Third national study. London: HMSO, 1986.

9 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.

10 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.

11 Smith A. Medical audit—closing the feedback loop is vital. Br Med J 1990;300:65.

Address for correspondence: Dr B. D. W. Harrison, Department of Respiratory Medicine, West Norwich Hospital, Bowthorpe Road, Norwich NR2 3TU.

Discs

The Journal will now accept discs to the following specifications:

Macintosh 3½ inch, using Microsoft Word

OR

5½ inch, 360K byte floppy disc with MS-DOS

Your discs should always be presented with two copies of the manuscript. Please ensure that your references accord exactly with Journal style. Please see Notes to contributors printed elsewhere in the Journal.