

number of B lymphocytes in untreated Cushing's syndrome may still be reduced.

Thirdly, after medical interference with the overproduction of cortisol in Cushing's syndrome there is a very prompt reappearance of PHA-sensitive as well as directly SRBC-binding lymphocytes in the blood, suggesting a reversible effect of steroids on T lymphocytes or their progenitors.

The data also suggested the following more tentative conclusions. The decrease of T lymphocyte responsiveness caused by Cushing's syndrome is probably of pathogenic importance in the development of the cryptococcal meningitis, since the arrest of glucocorticoid overproduction was followed by a specific in-vitro lymphocyte responsiveness to cryptococcal antigen that paralleled CSF clearance of the fungi (see table). The fact that the patient's lymphocytes did not spontaneously regain reactivity to PPD probably indicates that the T cells sensitised to these antigens were eliminated by the corticosteroids and that no new cells appeared in the circulation after the cortisol overproduction was arrested because no sensitising antigen was available.

On the basis of clinical evaluation and the fact that cryptococci could be cultivated only from the CSF before and within one week of treatment with fluorouracil, we feel that this drug in a dose of 250 mg/kg body weight⁻¹ day⁻¹ has been effective in arresting the proliferation and further spread of the fungi. We cannot explain why only half of the patient's lymphocytes carried B-cell and T-cell markers before her endocrine disorder was treated, whereas more than 95% carried one of the markers after her steroid production had become normal.

The assumption that a cortisol-producing adrenal adenoma was the probable cause of Cushing's syndrome in our patient was based on the lack of increment of 17-ketogenic steroids when metyrapone was given and the excellent result of treatment with this drug. The increase of plasma cortisol when ACTH was given is inconsistent with the diagnosis of adrenocortical cancer.

Patients with a unilateral adrenal tumour and overproduction of cortisol should have an atrophied adrenal gland on the contralateral side, and this was the case in our patient. The cause is a suppression of ACTH by cortisol produced from the tumour. We found ACTH values within the normal range, however, which should have prevented the atrophy of the contralateral gland. We therefore concluded that the immunoreactive ACTH

measured was probably biologically inactive, and the basal meningitis in this patient may possibly have stimulated the pituitary gland to release big ACTH. This has, however, never been described before. Big ACTH has identical immunoreactive characteristics to those of 1-39 ACTH but is biologically inactive.¹⁹⁻²¹

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Edinburgh Emergency Asthma Admission Service

G K CROMPTON, I W B GRANT

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Summary

In December 1968 an emergency service was set up in Edinburgh to enable patients with severe asthma to be admitted to hospital without delay. Up to 31 August 1975, 82 such patients had been admitted on 162 occasions, on 116 without the intervention of a general practitioner. The service is extended to patients particularly at risk of developing fatal asthma, and since it began no patient has died from asthma outside hospital. One patient,

however, died from tension pneumothorax that developed after admission. We believe that similar services should be available throughout Britain.

Introduction

Death from asthma may occur quickly and almost without warning. Speizer *et al*¹ investigated the increased mortality from asthma during the 1960s and found that out of 171 deaths 137 occurred suddenly and unexpectedly. Although the mortality from asthma is now lower than it was then, asthma remains an important cause of death. Cochrane and Clark² showed recently that many deaths occur before admission to hospital. A significant fall in mortality was reported by Jones³ when patients were admitted to a general intensive care area and treated by a medical team trained in the treatment of severe asthma. This reduction was achieved in patients referred to the intensive care area from the medical wards of the same hospital and other

Northern General Hospital, Edinburgh EH5 2DQ

G K CROMPTON, MB, FRCPED, consultant physician, respiratory unit
I W B GRANT, MB, FRCPED, consultant physician, respiratory unit

hospitals in the area, and confirms the findings of Grant⁴ that most patients will survive if they reach a fully equipped respiratory intensive care area alive. The major problem, therefore, is the delay in admission to hospital of patients with severe asthma.

In December 1968 an emergency service was set up in this unit to enable patients themselves or relatives or friends to arrange their direct admission to hospital.⁴ We report here the experience of this service up to 31 August 1975.

Organisation of service and selection of patients

Since patients who have had one or more episodes of status asthmaticus are an identifiable high-risk group,⁵ all such patients under the care of the unit were put on an "emergency list," and we undertook to admit immediately any patient on this list whatever the bed state in the unit and regardless of the source of the request for admission.

After discussion with the general practitioner each patient is given a card bearing his name, address, and unit number. The card states that the holder suffers from asthma and is under the care of the unit and that if he or she develops severe asthma admission to hospital may be arranged without prior notice, but that when possible the hospital should be informed by telephone of the patient's impending arrival. Copies of the emergency list are kept at the area health board, the emergency bed bureau (the Edinburgh equivalent of the Emergency Bed Service), the ambulance control, and in key parts of the hospital, such as the doctors' office, doctors' bedrooms, and the unit's nursing station. When the emergency bed bureau operators receive a request for an emergency admission they scan the list and, if the patient's name is on it, order an ambulance immediately and then notify the unit that a patient will be arriving in a few minutes. A list is kept at the ambulance control in case an ambulance is summoned by a 999 call. The area health board also has a list and has accepted administrative responsibility for the service. Clinicians simply inform the area health board when a patient should be added to or taken off the list.

Originally one list was made, but because of organisational problems, mainly in the ambulance control, with patients living outside the city boundary and therefore in the catchment area of another ambulance service, a separate list was compiled for patients living outside Edinburgh. In the case of these patients a list of all the general practitioners is also kept, as it was realised that this group might pose special problems because of the distance between their homes and the unit. Admission of such patients is usually arranged in conjunction with the general practitioner. Because of the enthusiastic support of general practitioners and the various authorities concerned the service was set up without difficulty.

To ensure efficient running of the service strict criteria for admission are adhered to and the lists are reviewed each year. Patients whose asthma has not been unduly troublesome for two to three years are taken off the lists.

Results

When the service was introduced there were 36 patients on a single list. In 1969 two lists were made, list A for patients living within the Edinburgh City boundary and list B for patients living outside Edinburgh. At 31 August 1975 there were 35 patients on list A and 12 on list B; only five of the original 36 patients were still on the lists. Altogether 82 patients had been included, of whom 45 were female and 37 male. Their age distribution is shown in table I.

TABLE I—Age in decades of patients on entry to emergency asthma admission service

Age in years:	<10	10-	20-	30-	40-	50-	60-	70-79
No of male patients	6	14	4	3	2	5	2	1
No of female patients	2	20	9	8	2	1	3	

The 82 patients had a total of 162 emergency admissions (table II), 89 of which were between 0800 and 2000, and 73 between 2000 and 0800. Admissions of patients on list A were almost equally divided between day (63 admissions) and night (65 admissions), but in the case of patients on list B there were many more admissions during the

day (26 admissions) than at night (8 admissions). On only 46 occasions was a patient admitted after consultation with the general practitioner. On 116 occasions entry to hospital was arranged by the patients or by relatives and friends. Most of these 116 admissions followed a telephone call to the unit, but about a third of the patients were brought to hospital in a relative's or friend's car or by taxi. A few admissions were made through the emergency bed bureau or after 999 calls.

TABLE II—Frequency of admission of patients to hospital

No of times admitted	No of patients		Total admissions (n = 162)
	List A	List B	
0	33	11	0
1	6	3	9
2	6	4	20
3	2	3	15
4	3	1	16
5	0	0	0
6	2	0	12
7	1	0	7
8	2	0	16
9	1	0	9
10	0	1	10
11	0	0	0
12	0	0	0
13	0	0	0
14	0	0	0
15	1	0	15
16	1	0	16
17	1	0	17

Two patients died. A man aged 63 died suddenly at home, and a presumptive diagnosis of myocardial infarction was made. The other patient, a woman aged 30, was admitted to hospital at the request of her general practitioner. On admission she was not critically ill, and initially she responded to treatment. A few hours later, however, her condition rapidly deteriorated and she died soon after being intubated and mechanically ventilated. Tension pneumothorax was diagnosed at a late stage, by which time attempts at resuscitation were unsuccessful. A chest x-ray picture taken on admission had shown no evidence of pneumothorax.

Intermittent positive-pressure ventilation (IPPV) has been used successfully to resuscitate three patients on six occasions. One patient, a boy aged 15, was successfully resuscitated from severe asthma complicated by pneumothorax. Another patient was mechanically ventilated on four separate occasions. This patient, a girl aged 14, rapidly develops severe status asthmaticus and has been admitted to hospital via the service 17 times in under three years. On two occasions artificial ventilation had to be instituted because of cardio-respiratory arrest, and on the other two occasions she was treated by IPPV because of ventilatory failure. Another patient has been admitted via the service on 16 occasions in three years. This boy, at the age of 11, was brought to Edinburgh by his parents after they had been advised by doctors in the North of Scotland to live close to the unit. He has received artificial ventilation on one occasion. A man aged 32, although he has had severe status asthmaticus on each admission to hospital, has not so far had to be treated by IPPV but has admitted himself via the service 15 times.

Thus three patients were responsible for 48 of the 162 admissions (table II), and on none of these occasions was the general practitioner consulted beforehand. Many patients on the emergency lists, however, have not used the service; 44 are in this category, having never been admitted at any time since being put on a list. With one exception, patients have been taken off a list only when their asthma has been well controlled for at least two years. The exception was a mentally subnormal woman aged 20 who was admitted to hospital on six occasions, but as the last four admissions were because of hysterical hyperventilation she was withdrawn from the service.

Discussion

The results of this service are difficult to assess because the patients are highly selected and there is no control group. Since no patient had died from asthma outside hospital and the one death in hospital cannot be regarded as a failure of the service there is no doubt in our minds that the exercise is worth while and should continue. Possibly some of the patients, particularly those given IPPV, would not have survived had they been

admitted to hospital via the normal channels with their inbuilt and unavoidable delays. Their survival would have been even less likely had they been admitted "normally" to general medical units without access to an intensive care area with full facilities for respiratory resuscitation.

In Scotland during 1969-72 there were 412 deaths from asthma outside hospital and 176 inpatient deaths,⁶ but without knowledge of the total number of patients with asthma in Scotland it is not possible to compare these figures with those obtained from the small selected group of patients admitted through our service. Cochrane and Clark,² however, calculated from their data a crude hospital admission mortality of between 1% and 2.4% and found that over 40% of "hospital deaths" occurred before admission.

All services designed especially for patients considered to be particularly at risk of developing a fatal illness have potential dangers. In the case of our asthmatic patients great care is taken not to cause undue concern about the potentially serious nature of their disease, but in general the reaction of the patient is one of relief rather than alarm when they are told that they, if the need arises, may bypass their general practitioners and admit themselves to hospital at any time. One patient abused the service by being repeatedly admitted with hysterical hyperventilation and consequently had to be removed from the list. This patient, however, was mentally subnormal, and since most of her admissions were arranged via her general practitioner this isolated failure cannot be used to discredit the concept of the service.

It is not possible to state categorically that the service has saved lives, but it is most likely that it has. If it has not, it has certainly enabled severely ill patients to be treated at an earlier

stage of their illness than would otherwise have been possible using conventional admission procedures. The organisation of the service was simple and the system has functioned well for almost seven years. We believe that the results justify its continuation, since every death from asthma is potentially avoidable, and the only way to reduce mortality at present is to admit ill patients rapidly to units with specialised facilities and skills for the treatment of severe asthma. Many hospitals in Britain could organise a service similar to the one described here, and we hope that our results will encourage them to do so. Facilities already exist in almost every general hospital in Britain. Coronary care units, and emergency ambulances serving them, have been organised in many hospitals. It would take little reorganisation to use these facilities for high-risk asthmatic patients, whose prognosis after resuscitation from a severe attack is usually infinitely better than that of a patient with myocardial infarction.

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Renal masses and ultrasound

THOMAS SHERWOOD

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Summary

Among the first 111 patients with renal masses examined by ultrasound most renal cysts (98%) and carcinomas (86%) were correctly detected. Diagnostic accuracy was high when ultrasound predicted a renal cyst (97%), but renal carcinoma accounted for only 60% of the complex echo masses found. Ultrasound was used as the primary, non-invasive test for the selection of outpatients with simple renal cysts for diagnostic puncture and for the selection of those with complex renal masses for more elaborate and expensive inpatient investigation. Ultrasound is not infallible but a safe diagnostic pathway may be drawn up in which ultrasound errors are not allowed to lead to diagnostic disasters. This approach reduced the use of arteriography for renal masses by two-thirds. With care the diagnosis of the common chance finding of a renal mass can be made simpler, safer, and cheaper.

Department of Radiology, St Peter's Hospitals, and Institute of Urology, London WC2H 8JE

THOMAS SHERWOOD, MRCP, FRCR, consultant radiologist and senior lecturer

Introduction

Renal masses are commonly found by chance on intravenous urography done for other reasons. Since such asymptomatic lesions may be curable carcinomas they must be accurately diagnosed. In the past this has meant a large and expensive investigative effort, including the frequent use of arteriography. The introduction of ultrasound scanning has made for simpler diagnosis, even in inexperienced hands.

Patients and methods

A standard commercial A and B mode ultrasound unit (Picker Echoview) was acquired at the end of 1972, and its use over 28 months on the first 111 patients is reported here. Only the first month of trial and error is excluded. A single operator with no special training performed almost all the scans. He was also the radiologist responsible for the patients' further investigation, which was an undoubted spur to making the best possible use of ultrasound. Careful scanning in two planes¹ took at least 15 minutes and often 30 minutes or longer.

The usual diagnostic pathway for patients with a renal mass is shown in the fig. Ultrasound was used to distinguish between patients with probable simple cystic lesions, who were then subjected to renal puncture, and the few with complex masses, who were admitted for more elaborate investigations. Lesions thought to be renal cysts were generally punctured at once under fluoroscopic control, allowing a complete diagnosis to be made during one outpatient visit. For various reasons 16 out of 56 such patients did not have their renal cysts