Slowing the rate of acute medical admissions

ABSTRACT – We studied the effectiveness of a dedicated medical receiving room (MRR) with senior registrar (SR) assessment of GP requests for medical admission. In the first of three 16-week study periods, patients were assessed by senior house officers or registrars. In the second period, patients were assessed by a single SR. In the third period, nine SRs manned the MRR on a rota. Outcome measures included same-day discharge rate, use of specialist beds and 28-day readmission rate. A questionnaire was sent to general practitioners (GPs) of patients discharged in period three to assess their satisfaction with the service. The same-day discharge rate increased from 3.6% in period one to 29% in period two ($p < 0.001$) and 15% in period three ($p < 0.001$). The use of specialist and off-site beds also increased from 1.2 per week in period one to 2.9 in period two and 3.1 in period three. The 28-day readmission rate was 13.3% in period one, 6.9% in period two and 6% in period three. The GPs were satisfied with the service provided by the MRR and all felt that the discharge was appropriate. Assessment of GP referrals for acute medical admission by SRs in a MRR allows more patients to be safely discharged on the same day than if the assessment is carried out by a more junior doctor. SRs also direct more patients to the relevant specialty, so improving patient care and effective use of available beds.

The number of patients admitted acutely in medical specialties is rising inexorably year on year[1,2]. The growing number of elderly people surviving longer is one important factor but there may be others, such as greater public expectations for hospital treatment or inappropriate referrals.

Recent studies have highlighted the problem of inappropriate use of medical beds in acute hospitals. One found that only 38% of bed days were required for patients in hospital for medical, nursing or life support reasons[3]. Victor *et al* reported that 14.6% of patients in an inner London hospital were inappropriately located in an acute bed[4]. One of the five problem areas identified by the Audit Commission was admission procedures[1]. In some hospitals admission procedures are poorly organised and junior medical staff, if inexperienced and inadequately supervised, sometimes admit patients inappropriately.

This study investigated whether early assessment of general practitioner (GP) referrals by a senior registrar (SR) in a medical receiving room (MRR) would result in a lower admission rate and increased use of specialist investigations, specialty beds and early outpatient appointments. We also evaluated the relative effectiveness of manning the unit with one doctor against several doctors working on a rota basis.

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Method

The resident medical officer (RMO) of registrar grade coordinated acute medical admissions to the Leeds General Infirmary (LGI) before the MRR opened. GP referrals accepted by the RMO were assessed in the accident and emergency department (A&E) for admission or discharge. Patients who had not been referred to the RMO or who arrived by emergency ambulance were assessed by casualty officers and then referred to the RMO as appropriate. The RMO then reviewed the patient in A&E before a final decision on admission was taken.

The MRR is a dedicated five-bedded unit at Leeds General Infirmary near to A&E, for the assessment of acute medical referrals. All GP telephone requests for acute admission were discussed with the senior registrar on call. Initial triage of all GP medical referrals occured in A&E and any patients who were very unwell were transferred directly to the resuscitation area. All other medical patients were transferred to the MRR. Selected referrals from A&E were taken if there was doubt about whether the patient was fit for discharge. The number of A&E referrals seen in the MRR was small (mean five per week). There may have been differences in case mix between GP referrals and those from casualty officers in A&E, so only the direct GP referrals were considered in this study. The unit was open between 11 am and 7 pm Monday to Friday to coincide with the daytime peaks of GP referrals, which were found to occur at lunch time and early evening. The opening time was restricted because of the limited numbers of senior registrars available to run the unit. The cooperation of other departments such as haematology, biochemistry, radiology and the endoscopy unit was sought before the MRR was set up. The rapid access to investigations was an important factor in the running of the unit.

This study was a prospective analysis of acute referrals for medical admission to the LGI which were seen during the opening hours of the MRR. There were three periods of assessment:

1. Sixteen weeks when the MRR was first opened (June–September 1993) and was manned by senior house officers and registrars who had all their other normal duties to perform (study period one).

2. The subsequent 16 weeks (October 1993 to January 1994) when the MRR was manned by one SR with no other responsibilities (study period two).
3. Eighteen months later a further 16 weeks (May–August 1995) when the MRR was manned by nine SRs (study period three). Each SR worked exclusively in the MRR for one week at a time and was unaware of the study. One of the authors worked in the MRR for three of the study weeks. The same-day discharge rate for these three weeks was higher, so these weeks were not included in the analysis.

The SR was responsible for assessing all patients on arrival and arranging appropriate tests. The GP was contacted by phone if the patient was fit for discharge and was sent a written report within two working days.

The outcome measures for this study included same-day discharge rate, 28 day readmission rate, place of admission, provision of outpatient appointments and use of specialist investigations. Place of admission was classified as general/geriatric medicine, short-stay ward (overnight stay observation ward) or specialty ward (coronary care, neurology, surgery, gynaecology).

All GPs of patients discharged in study period three were sent a questionnaire relating to the subsequent clinical course of the patient. They were also asked whether they were satisfied with the communication and follow-up of their patients and what improvements they felt could be made.

The differences in same-day discharge in the three study periods were analysed using the chi-squared statistic.

Results

The total number of acute medical admissions to the LGI was 170 per week during the summer months and 230 per week in the winter. The mean number of patients seen each week in the MRR increased from 26 during period one to 34 in period two and fell back to 25 in study period three. The increase was partly due to a higher proportion of acute medical referrals being seen in the MRR rather than in the A&E department in period two. The proportion of medical referrals for admission seen in the MRR between 11 am and 7 pm was 54% in period one, 66% in period two and 49% in period three.

Discharge rate

The same-day discharge rate from the MRR was 15 out of 416 patients in period one. During period two, more patients (160/544) were discharged than in period one ($p < 0.001$). In period three, fewer patients were discharged (49/327) than in period two ($p < 0.001$) but more than in period one ($p < 0.001$). These results are shown in Table 1.

Table 1. Same-day discharge rate from the MRR

Study period	No. of patients seen in MRR	No. of patients discharged	Percentage discharged	*p* value
1	416	15	3.6	–
2	544	160	29.4	<0.001
3	327	49	15	<0.001

The patients who were discharged came from all age groups. Of those discharged during period one, 6/15 (40%) were aged over 60 and 3/15 (20%) were aged over 70. During period two, 91/160 (57%) of those discharged were aged over 60 and 59/160 (37%) were aged over 70. Of those discharged during period three, 19/49 (38.8%) were aged over 60 and 11/49 (22.4%) were aged over 70. The numbers discharged during period one are too small to make detailed statistical comparisons with the other two periods.

Use of beds, outpatient appointments and investigations

The majority of patients were admitted to general or geriatric medicine beds in all three study periods. The use of short-stay and specialty beds increased from 19/416 (4.5%) in period one, to 46/544 (8.5%) in period two and 40/327 (12.2%) in period three. The use of specialised hospital investigations was studied in period three: 32 such investigations were performed on the day of assessment. The investigations were: ultrasound of the leg 11, venography 10, ultrasound of the abdomen 4, ventilation perfusion scan 4, computed tomography (CT) head 2 and endoscopy 1. Sixty-one (38%) patients discharged in period two, and seven (14.3%) discharged in period three received new outpatient appointments. These appointments included referrals to general medicine but also to specialty clinics such as neurology, cardiology and ENT (ear, nose and throat).

Readmission rate

The 28-day readmission rate for patients discharged in period one was 13.3% (2/15) in period one, 6.9% (11/160) in period two and 6% (3/49) in study period three. The overall 28-day readmission rate for all general and geriatric medicine discharges in the same time was 4.6% in study period two and 6% in study period three. In study period one, the numbers discharged were too small to make comparisons of the readmission rate.

Variation in SR practice

In study period three there were eight SRs manning the MRR and the same-day discharge rate varied from

Table 2. Variation in discharge rate, outpatient appointments (OPA) and readmission rate between SRs

SR	Number of patients seen	Number (%) discharged same day	Number given OPA	28-day readmission
1	28	7 (25%)	0	0
2	35	8 (22.9%)	3	2
3	47	6 (12.8%)	0	0
4	28	4 (14.3%)	0	0
5	52	5 (9.6%)	0	0
6	46	3 (6.5%)	1	0
7	21	4 (19%)	0	1
8	61	11 (18%)	3	0

6.5% to 25% between SRs (Table 2). This trend did not reach statistical signficance.

GP survey

All 49 GPs of patients discharged in study period three were identified and were sent the questionnaire about the MRR. Thirty-one replies were received and in all cases the GPs were satisfied that discharge had been appropriate. However, in three cases the clinical course of the patient was not as predicted though none required readmission to hospital. In two cases this was because further outpatient follow-up or investigation had not taken place. In three cases the communication was not satisfactory, in one case because the letter had been sent to the wrong GP. Three GPs said that the method of referral to the MRR was not clear enough.

Discussion

Emergency hospital admissions in the UK are rising year on year[1,2]. There has been little research to determine the reason for this rise in admission rate though several explanations have been suggested. They include an ageing population, greater social deprivation, increased public expectations of hospital treatment and lower threshold for admission by GPs who may fear litigation[5].

There is a large variation in the likelihood of being admitted to hospital as an emergency in different districts which cannot be explained by differences in age, sex or morbidity[1]. Procedures for the assessment of patients referred by GPs for emergency medical admission vary in different hospitals. In the absence of clear guidelines for admission, inexperienced junior doctors may feel unable to discharge patients or may be influenced by other factors such as bed availability[1]. Little has been done to evaluate ways of reducing the inexorable rise in acute admissions to hospital[5].

The MRR was conceived as a way of improving the system of medical admissions to the LGI. The aims of the unit were: to reduce the number of unnecessary medical admissions, to use urgent investigations and outpatient facilities more efficiently and to increase admission to specialty beds (including off-site elderly care beds), and to improve communication with GPs.

An impressive increase in the number of patients discharged from the MRR was noted in the second period (same-day discharge increased from 3.6% to 29.4%) without a large number of readmissions.

However, more patients were seen in the MRR during the second period. Period two occurred during winter months when there is a large increase in medical admissions. It is not clear how this factor might alter the same-day discharge rate, if at all. The other change was that the proportion of medical referrals seen in the MRR increased in period two, indicating that more GPs telephoned the SR with referrals to the MRR. GPs may have referred less ill patients for an urgent opinion which may have altered the case mix. This may have been partially responsible for the higher same-day discharge rate in period two.

The third study period was undertaken when the MRR had been open for nearly two years and it was found that the number of GP referrals had fallen to the level in period one. The proportion of patients discharged on the same day had also decreased to 15%. We believe that period three provides an accurate picture of the potential benefits of the MRR in terms of reduced admissions and more efficient bed usage. Potential reasons for the fall in same-day discharge in period three are:

- The pattern of GP referral may have altered again.
- The single SR in study period two was solely responsible for the unit and his drive and energy undoubtedly contributed to the original success.
- The specialty of the SRs in study period three varied and so did their clinical experience. In addition, some were new to the hospital and may have been unaware of all its procedures.
- Some doctors are more cautious than others in their individual assessment for admission, though this is difficult to quantify.

During periods two and three more patients were admitted to specialist or off-site beds, which improves patient management and reduces the need for transfers later in the hospital admission. This use of specialist beds requires an accurate diagnosis and liaison with other teams in the hospital; this role was more effectively performed by the SRs.

Many patients who were discharged had further investigations and follow-up arranged as outpatients. The proportion of patients given an outpatient appointment in period three was less than that in period two. The explanation for this reduction is unclear but it may relate to the lower discharge rate. The SRs in period three may only have discharged

patients with less severe illnesses, so fewer required follow-up. The implication is that if patients are discharged from an assessment unit, there must be sufficient outpatient provision to allow rapid access by the SR.

Good communication with GPs was encouraged by requiring all doctors in the unit to telephone the GP if a patient was being discharged. A formal typed letter was also sent, ideally within 48 hours. The large majority of GPs felt that communication was satisfactory and in only three cases did the subsequent health of the patient deteriorate. In none of these cases was the deterioration severe enough to warrant readmission.

The opening times of the MRR were limited because of the number of suitable staff available. The opening times were chosen to coincide with the peak times for GP referrals. The proportion of patients seen in the MRR is small in comparison with the total number of admissions. However, the number of 'unnecessary' admissions avoided is still considerable (Table 1). It takes considerably more time and effort to discharge a patient safely than to admit to hospital. The extra time is required to arrange urgent tests, review the results and explain the implications to patients and carers, arrange outpatient appointments, telephone the GP and dictate letters. The SR had to perform all these tasks during this study but the key tasks are clinical assessment and communication. Further development of the MRR is taking place in the light of this experience.

We believe that our results could be reproduced in many other units. The senior registrar grade will soon disappear but other experienced doctors could run similar assessment units. Many hospitals do not have so many higher trainees available. However, a flexible system of manning such a unit with experienced doctors should be possible in most hospitals.

Conclusion

An assessment by a single SR in the MRR was effective in reducing medical admissions without a large readmission rate. When the MRR was manned by a number of SRs in rotation the same-day discharge rate was still four times higher than when more junior staff performed the assessments.

Key factors for success

- Experienced medical opinion
- Dedicated area for assessment
- Adequate time without other commitments for SRs on duty
- Rapid access to specialist investigation
- Access to early outpatient clinic appointments

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