

Clinical audit on short stay emergency medical admission

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The growth rate of emergency department visit locally is disproportionate to the population growth. The number of emergency hospital admission has also increased leading to congested ward environment. A retrospective clinical audit on short stay (discharged within 24 hours) emergency medical and geriatric admission was done to look at the appropriateness of our emergency medical and geriatric admission. This study was carried out in April 2000. The Appropriateness Evaluation Protocol was employed as an objective tool for initial assessment. A peer panel, composed of Fellows from the Colleges of Physicians and Emergency Medicine, was formed to check for appropriateness of admission for those cases without objective admission criteria. Thirteen out of the 177 cases (7.3%) available for analysis were considered as "inappropriate" admission. If we assume that those emergency admissions that stayed for longer than 24 hours were appropriately admitted, the "inappropriate" admission rate for medical and geriatric cases would be 0.67% (13 out of 1930). Suggestions for further improvement include: (1) longer and intensive observation for selected patients before admission; (2) access to early specialist outpatient review; (3) ad-hoc clinics to be run by other specialists for selected "old" cases; and (4) strengthening of the primary health care service. (*Hong Kong j.emerg.med.* 2003;10:30-36)

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Introduction

As part of the continuous quality improvement (CQI) process, the Accident and Emergency Department of Tuen Mun Hospital launched a clinical audit on the appropriateness of emergency admission. The audit tool employed was the Appropriateness Evaluation Protocol (AEP)¹ (Appendix 1) which was the same as that used in 1993² and 1994³. The target patient group was emergency medical and geriatric (M&G) admission that were discharged within 24 hours of hospital admission. The main reasons for selecting

such a highly specific patient group were: (1) increased number of total emergency admission; (2) increased number of M&G admission; (3) congested environment in M&G wards; and (4) increased number of short stay (discharged within 24 hours) M&G admission.

In this clinical review, we also looked into the possible and practical measures that might help reduce "inappropriate" admission so as to optimize resource utilization and relieve the congested hospital environment.

Method

Sample selection

From the Accident & Emergency Information System (AEIS) computer system of our department, statistical data on clinical service for the month of April 2000 were obtained. Total emergency attendance for the month was 18,663 with an average daily attendance

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of 622. The total hospital emergency admission was 4,295 with an overall admission rate of 23%. There were 1,930 patients admitted into the M&G specialty (on average, 64 admissions per day), among which 191 cases (9.9%) were discharged within 24 hours after admission. The case list of these short stay M&G admission was then generated for review.

The review process (Figure 1)

The emergency department (ED) records were retrieved and reviewed to check that the Adult AEP Admission criteria were met. (Appendix 1) Criteria 1-10 and 14 of the AEP were set as the explicit criteria for reviewing the ED record alone. The in-patient records of those cases which did not meet the criteria 1-10 and 14 were retrieved to check for compliance with criteria 11-13 and 15-16. These criteria were required to be met on the day (24-hour period) of admission.

A Peer Panel, consisting of the Chief of Service and a Senior Medical Officer of our ED, together with a Senior Medical Officer from the M&G department (all 3 are Fellows of their respective Colleges), reviewed the remaining case records which did not satisfy any AEP criteria. During the review process, a frontline Medical Officer was invited to supplement clinical information and opinion. Implicit criteria such as psychosocial and personal factors, findings on clinical records, the clinical course after admission, and the discharge diagnosis were all evaluated during the panel review. Comments and suggestions were recorded for subsequent improvement in the system.

Results

ED record screening

ED records for these 191 short stay M&G cases were traced. Sixty-seven cases satisfied one or more criteria for admission.

Hospital record screening

For the remaining cases, 111 hospital records were available for evaluation. One case was excluded from

the study because the patient was transferred to another public hospital for further management instead of being discharged home. Thirty-two cases satisfied one or more of the admission criteria.

Peer panel review

The remaining 78 records were assessed by a Peer Panel. A further 65 cases were considered as appropriate admission. Examples of the cases that met with the implicit criteria were: chest pain as a persistent or worrying symptom (19/65 or 29.2%); dizziness as a persistent or worrying symptom (18/65 or 27.7%); transient loss of consciousness (5/65 or 7.7%); lower respiratory tract infection (7.7%); and shortness of breath secondary to acute bronchospasm or chronic obstructive airway disease (7.7%). (Figure 2) Among these 65 patients, two of them (3.1%) initiated the request for admission. Four (6.2%) patients reattended our department with the same symptomatology within 72 hours, signifying that they were dissatisfied with the persistence or worsening of symptoms despite the treatment offered in the previous ED visit.

"Inappropriate" admission

Finally, 13 cases (out of 177, i.e. 7.3%) were considered as "inappropriate" admission. Examples of these cases are discussed in "suggestions from Peer Panel".

If we accept the assumption that those emergency admissions stayed longer than 24 hours in our M&G department were appropriately admitted, then our "inappropriate" admission rate was only 13 out of 1930 total emergency admissions (0.67%).

Frequency of occurrence of criteria 1-10 and 14 (Figure 3)

Among these 11 criteria accessible from the ED record alone, the most frequently occurring was criteria 3, namely abnormal blood pressure (41 out of 67 or 61.2%). Criteria 7 (active bleeding) and 14 (observation for toxic reaction from chemotherapeutic agents, including drug overdose) were the second commonest (10 out of 67 or 14.9%). Criteria 1 (disturbance of conscious level) and 2 (abnormal pulse rate) were the third commonest (6 out of 67 or 9%).

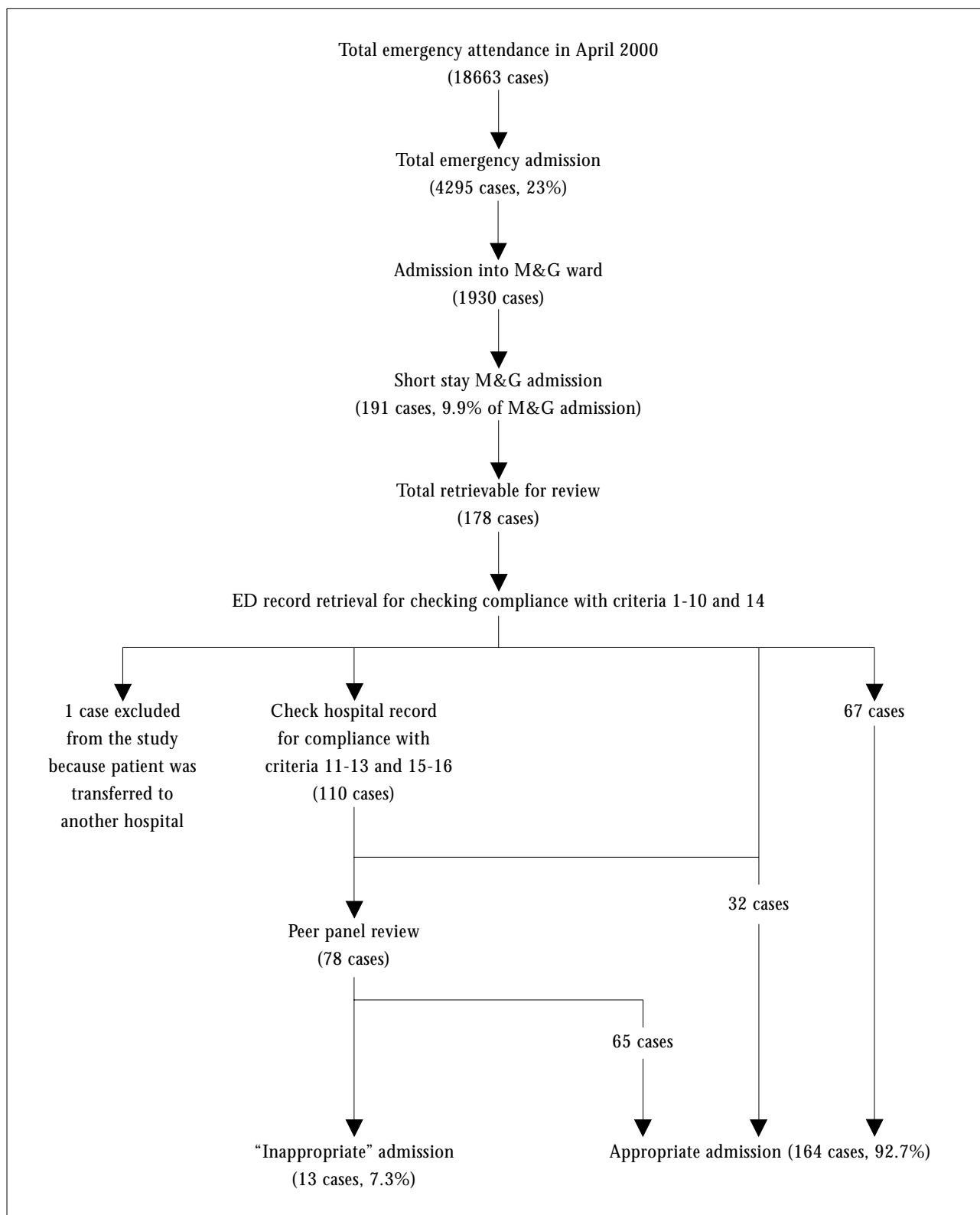


Figure 1. The process of clinical audit.

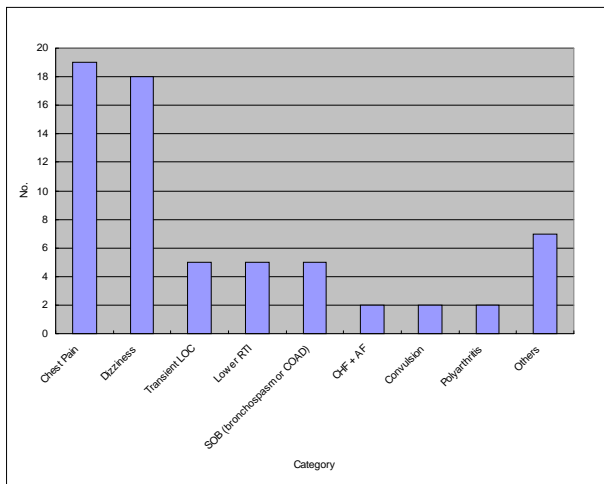


Figure 2. Patient categories that passed the peer panel.

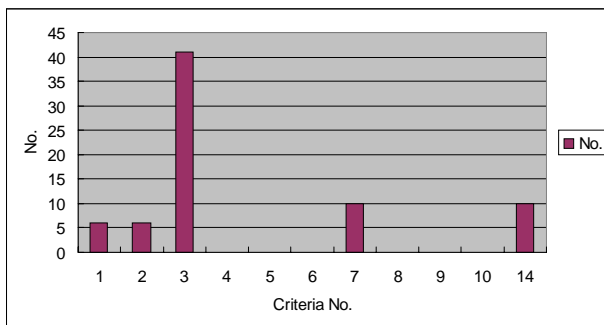


Figure 3. Frequency of occurrence criteria 1-10 and 14.

Suggestions from peer panel

During the peer review, several suggestions were made for improvement in patient management:

1. More prolonged and intensive observation in the ED for some subgroup of patients such as chest pain without evidence of serious underlying diseases, non-specific dizziness and transient loss of consciousness;
2. Referral to specialist outpatient clinic instead of admission (e.g. suspected Behcet's Syndrome, extrapyramidal side effect of antipsychotic medication, stable palpitation and newly diagnosed uncomplicated diabetes mellitus etc.);
3. Referral back to the general outpatient clinic or family medicine doctors (e.g. simple diabetes mellitus);
4. More in-depth investigation for diagnostic evaluation;
5. Improvement in the accuracy of clinical signs;
6. Improvement in communication for those patients with language or dialect barrier; and
7. Prioritization of the major presenting problems of each patient so that the patient can be admitted to the most appropriate specialty.

Discussion

Tuen Mun Hospital is an acute general hospital with 1,700 hospital beds. It was established in 1990 and is now serving a population of over 900,000 (predominantly from but not exclusive to the Tuen Mun and Yuen Long districts). Positive population growth is expected in these districts in the coming decade. Major construction schemes nearby are either in progress (Western Railway) or under planning (Lok Ma Chau Branch of Eastern Railway, new check point across the border with Mainland China, and highway and bridges linking Lantau Island, Macau and Mainland China). Moreover, the demand for ED service has increased dramatically in Hong Kong in the last decade. Our population rose from 5,752,000 in 1991 to 6,665,000 in 2000 (15.9% increase) (Figure 4) while the total annual ED visits increased from 1,288,995 in 1991 to 2,423,079 in 2000 (88% increase).⁴ (Figures 5 & 6) The data in our hospital is even more alarming: our daily ED visits in 1992 was 330 while in 2001 it was 743 (125.2% increase). (Figure 7) Therefore, there is ever-increasing pressure on our limited resources.

Short stay emergency M&G admission is chosen for our present audit because the total number of emergency M&G admission appeared to have increased leading to congestion of the in-patient wards. In the first 10 months of 2001, emergency M&G admission constituted more than half (50.7%) of the

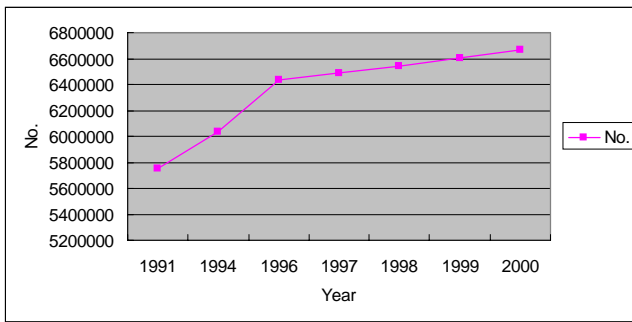


Figure 4. Mid-year population, HKSAR.

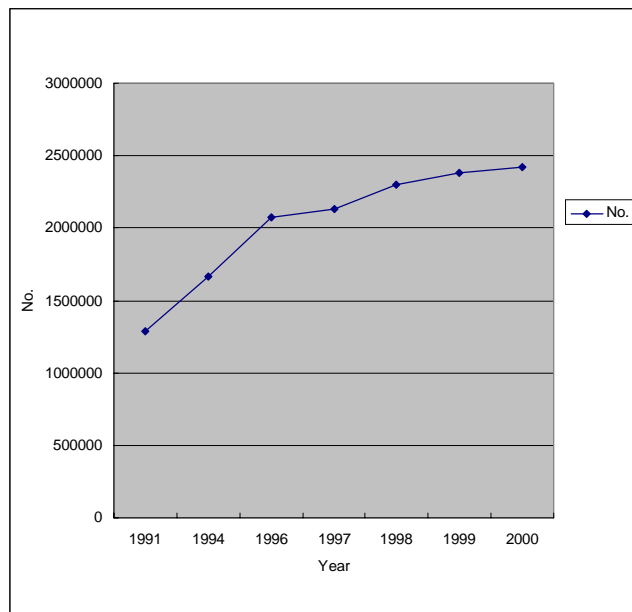


Figure 5. Total ED attendance of HKSAR.

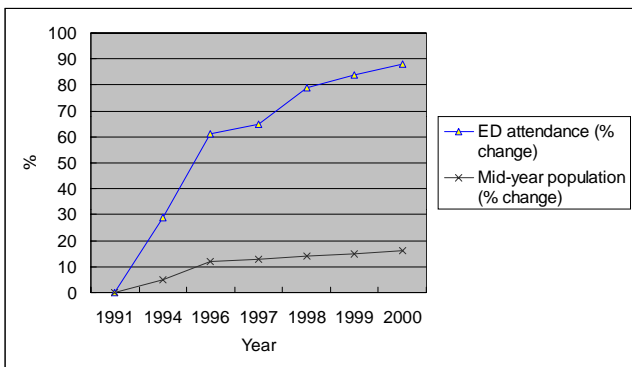


Figure 6. Comparison of change of total ED attendance with that of mid-year population, HKSAR (taking Year 1991 as baseline).

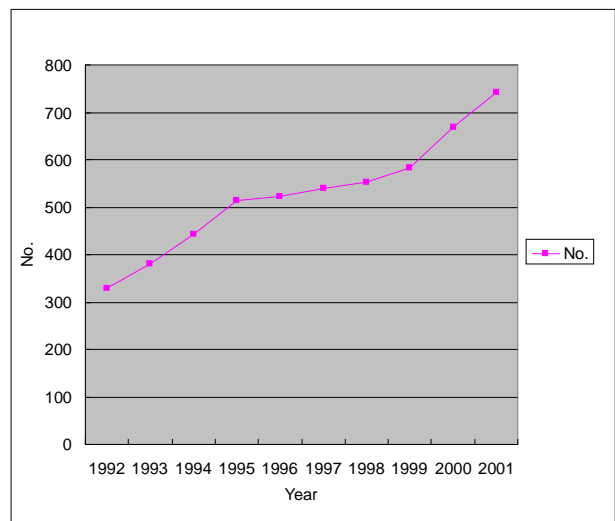


Figure 7. Daily new case attendance of ED, TMH.

total emergency admission through the ED. It is just too natural to think that some short stay admission cases may not need in-patient care if management and support at the ED and community level is enhanced.

Two previous audit studies had been carried out in our department on the appropriateness of emergency admission. The rate of "inappropriate" medical admission was 1.02% in the 1993 study by Ng² and 4.5% in the 1994 study by Lo and Yau.³ However, one should note that these 2 studies looked at all emergency medical admission (age between 14 and 77) while our present study focus on short stay M&G cases only. Since our medical and geriatric units have merged under the new M&G unit, we have to include patients above 77 years of age for analysis. Therefore, the previous study results are not directly comparable to our result.

Out of the 191 short stay M&G admission cases, at least one case was not short stay in the sense that the patient was transferred to another hospital for care rather than being discharged home. We have analysed at least 93.2% (i.e. 177 out of 190) of the short stay M&G admission in April 2000. Bias due to sampling error should be minimal.

There were altogether 37.9% (i.e. 67 out of 177) of cases that satisfied the objective admission criteria from the ED data alone. Another 18.1% (n=32) cases satisfied admission criteria after reviewing the hospital record. Therefore, 55.9% (n=99) of cases satisfied the objective criteria for admission. In the peer panel review, a further 36.7% (n=65) were considered as appropriate admission. Finally, the rate of "inappropriate" admission for the subgroup of patients staying for less than 24 hours was 7.3% (n=13).

An "inappropriate" admission rate of 7.3% would appear quite unacceptable to the layman. However, data from Australia⁵ showed that their rate of inappropriate admission (in general) ranged from 6% to 19%. Furthermore, the actual number was less than 1 case every 2 days (13 case over 30 days or 1930 admission; or 0.67%). There is no historical data for comparison.

There are several potential areas that are worth exploring to reduce "inappropriate" admission. One such initiative is to provide more prolonged and intensive observation for selected patients within our department. There are 8 beds, one holding room (for psychiatric or violent patient) and a handful of sitting capacity within our observation area. No built-in bedside or central monitoring system is installed. Portable equipment has to be moved in for patients who require intensive monitoring. The utilization rate of the observation area is already quite high, with an average of 195 patient-hours per day in the first ten months of 2001. Moreover, due to the limitation of space, our observation area also functions as a temporary holding area for those patients awaiting clinical reassessment and admission. Therefore, the environment is quite congested especially during the daytime. If more prolonged and intensive observation is to take place in the ED, there should be appropriate modification and improvement in the physical set up (perhaps re-location), monitoring facilities and manpower allocation so as to ensure quality service.

Some patients may not need in-patient management but deserve an early specialist appointment for

evaluation of their problems. The waiting time for new appointment for the M&G specialist outpatient clinic was 21 weeks as at 1.12.2001 (at the discretion of the respective unit). Such a prolonged gap of time between ED attendance and specialist appointment would bring about dissatisfaction and anxiety to both patients and ED doctors. The medical new case default rate was about 16%. A system whereby allocation of a couple of early appointments for the ED patients will be helpful to ensure early specialist attention.

Another possibility is the setting up of an ad-hoc clinic being run by our specialists to deal with "old" cases with some degree of change of their condition but not to the extent of an emergency. Such service had been in practice unofficially in some areas like some dialysis units and oncology department.

In most parts of the world, ED is taken as the ultimate safety net for the health of the community. However, the safety net function (and perhaps a heavy burden) is especially important in our local situation since there is no well structured public primary health care service for the community. With the development of Family Medicine locally, we hope that there will be a structured and high quality service (primary health care and out-reaching specialist medical and nursing teams) for our public.

Concerning the frequency of occurrence of criteria 1-10 and 14, one may find that no patient fit into criteria 4-6 and 8-10. This is not surprising at all since our target patient group is short stay group of patients. Patients having any of the above criteria are much less likely to be discharged within 24 hours. It is a pity that no recognition is given to the readings of non-invasive percutaneous oxygen saturation (SpO₂) in the objective criteria. Pulse oximetry is used widely in local EDs for rapid, convenient, portable and non-invasive continuous bedside assessment and monitoring.

In other parts of the world, people also used a similar set of assessment tools^{6,7} to evaluate the appropriateness of hospital stay. This is another area that is worth

exploration now when efficiency and cost-effectiveness are being strongly emphasized.

Conclusion

The demand for medical service in our local population is still escalating. There are potential areas that may improve the congested environment of the hospital. We may reduce our 7.3% of "inappropriate" admission of short stay cases by a concerted effort between the government, profession and community.

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Appendix 1. Adult AEP Admission Criteria

A. Severity of Illness Criteria

1. Sudden onset of unconsciousness or disorientation (coma or unresponsiveness).
2. Pulse rate:
 - (a) Less than 50 per minute
 - (b) Greater than 140 per minute
3. Blood pressure:
 - (a) Systolic less than 90 or greater than 200 mmHg
 - (b) Diastolic less than 60 or greater than 120 mmHg
4. Acute loss of sight or hearing.
5. Acute loss of ability to move body part.
6. Persistent fever equal to or greater than 100°F (po) or greater than 101°F (rectal) for more than 5 days.
7. Active bleeding.
8. Severe electrolyte/blood gas abnormality (any of the following):
 - (a) Na <123 mEq/L
 - (b) Na >156 mEq/L
 - (c) K <2.5 mEq/L
 - (d) K >6.0 mEq/L
 - (e) CO₂ combining power (unless chronically abnormal) <20 mEq/L
 - (f) CO₂ combining power (unless chronically abnormal) >36 mEq/L
 - (g) Arterial pH <7.30
 - (h) Arterial pH >7.45
9. ECG evidence of acute ischaemia; must be suspicious of a new MI.
10. Wound dehiscence or evisceration.

B. Intensity of Service

11. Intravenous medications and/or fluid replacement (does not include tube feedings).
12. Surgery or procedure scheduled within 24 hours requiring:
 - (a) General or regional anaesthesia or
 - (b) Use of equipment, facilities, procedure available only in a hospital.
13. Vital sign monitoring every 2 hours or more often (may include telemetry or bedside cardiac monitor).
14. Chemotherapeutic agents that require continuous observation for life-threatening toxic reaction.
15. Intramuscular antibiotics at least every 8 hours.
16. Intermittent or continuous respirator use at least every 8 hours.