

Study on the discrepancies between the admitting diagnoses from the emergency department and the discharge diagnoses

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Objective: To study the extent of diagnostic discrepancies at admission (diagnoses made by doctors in the Emergency Department) and discharge (final diagnoses at the ward) in our Emergency Department (ED) where the doctors have direct admitting rights; and how such discrepant diagnoses affected inter-departmental transfer of patients after their admission. **Method:** A non-concurrent cohort study was performed on admissions through our ED between 24th to 30th April 1997. The admitting and discharge diagnoses and units were recorded. The reasons for the unmatched diagnoses and inter-departmental transfers were studied. The significance of transfers amongst patients who had matched and unmatched diagnoses was compared using the Chi-test at 95% confidence interval. **Results:** Three hundred and sixty-one admissions were recorded during the study period. There were 314 (86.7%) and 47 (13.3%) admissions with matched and unmatched diagnoses respectively. Nine of the 47 admissions with unmatched diagnoses and 16 of the 314 admissions with matched diagnoses were transferred ($p=0.001$). **Conclusion:** The ED doctors achieved a high level of diagnostic accuracy. The most common reason for unmatched diagnosis was because of the difficulty of diagnosing the patient's complex medical problem in the short contact time in the ED. The level of accuracy should increase with the advent of more diagnostic modalities and increased contact time with the patients in the ED. (*Hong Kong j.emerg.med.* 2002;9:78-82)

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Introduction

The Emergency Department (ED), Tan Tock Seng Hospital received about 110 000 attendances in 1997. It also received the most number of ambulance patients amongst all the hospitals in Singapore. Three emergency physicians and 23 medical officers who are at least one year post-registration attended to these patients.

An important practical and interspecialty debate revolves around the issue of whether emergency physicians should be able to directly admit patients to hospital wards or whether specialty doctors should assess the patients first.

In our hospital, the ED has direct admitting rights to the inpatient service. This is also the practice in the other hospitals in our country. We recognise the fact that there are currently no "gold standard" available for measurement of admissions. We also could not find any information in the literature with regards to such a "gold standard".

As part of our ED's continuous effort in self-audit and in conjunction with the hospital's goal of utilising our resources optimally, this study was performed to verify the extent of discrepant diagnoses. We

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recognised that there are other performance indicators like the incidence of wrongful discharge from the ED or the unplanned revisit rates within 24 hours of discharge¹ but we decided to examine the accuracy of our ED diagnoses first.

The aim of this study was to determine the extent of the diagnostic discrepancies at admission and discharge. We also determined if such discrepant diagnoses resulted in significant inter-departmental transfer of patients after their admission.

Methods

We reviewed all adult admissions via our ED retrospectively from 24th to 30th April 1997. The ED doctors have direct admitting rights to the departments of General Medicine, General Surgery, Cardiology, Geriatrics, Neurology, Neurosurgery, Orthopaedics and Rheumatology.

As the paediatric department was relocating to another premise during the study period, many of the inpatient records were not available to us. We therefore decided to exclude the paediatric admissions from our study.

All the 361 case records were reviewed by one emergency physician from the ED. The following information were obtained from the records:

- a. the admitting diagnosis and the unit that the patient was admitted to
- b. the discharge diagnosis and the unit from which the patient was subsequently discharged from
- c. the details of what happened during the course of the patient's admission were also reviewed as we recognised the dynamic nature of the patient's clinical problems

After reviewing the case records, the following information were obtained:

- a. the total number of cases with matched diagnoses (i.e. the admitting and discharge diagnoses were

either the same based on the ICD-9 coding or they belonged to the same broad diagnostic grouping, e.g. a patient who is admitted for sepsis and later diagnosed with hepatobiliary sepsis.)

- b. the total number of cases with unmatched diagnoses (i.e. the admitting and discharge diagnoses were different)
- c. the total number of cases that were transferred to another unit after admission (i.e. the admitting and discharge units were different)
- d. the cases in (c) with matched and unmatched diagnoses

We then studied if an unmatched diagnosis resulted in an increased incidence of inter-departmental transfer by the Chi-test at 0.05 level.

We further reviewed the case records of the cases with unmatched diagnoses to identify the reason(s) for their occurrence. We divided the reasons of the unmatched diagnosis into:

- a. those whose diagnoses were incorrect (e.g. patient who had a bleeding in the upper gastrointestinal tract was admitted for giddiness)
- b. those whose medical condition progresses and therefore present differently when reviewed in the ward (e.g. a patient who presented with lower abdominal pain who was later found to have appendicitis)
- c. those who could not provide any history to the attending ED doctor (e.g. a patient with right lung tumour but unaware of his own diagnosis presented to the ED with haemoptysis, the ED doctor admitted him with the diagnosis of pneumonia)

Those admissions that had matched diagnoses and yet transferred were also studied. We divided them into:

- a. those who were transferred for further management in another unit (e.g. patients who were admitted for drug overdose were initially admitted to the medical unit, but transferred to the psychiatric unit subsequently for further treatment)
- b. those who were transferred because they developed

other medical problems after admission (e.g. a patient who was admitted to the medical unit for congestive cardiac failure later developed subacute bacterial endocarditis and was then transferred to cardiology)

Results

We studied 361 cases that were admitted through our Emergency Department during the study period.

Forty-seven of the 361 (13.3%) admissions had unmatched diagnoses while the 314 (86.7%) cases were admitted with matched diagnoses. Twenty-five (6.9%) of the 361 admissions were transferred. Eighteen (37.5%) of them were admitted to general medicine, 16 (35.4%) to general surgery, 8 (16.7%) to neurology, 4 (8.3%) to cardiology and 1 (2.1%) to neurosurgery. Nine of these 47 admissions were subsequently transferred; of which 3 admissions had a wrong diagnosis, 5 were admitted with a diagnosis that could not be made without further investigations while the last case was wrongfully diagnosed because the patient could not give a proper history. The distribution of the reason for cases admitted with unmatched diagnoses is found in Table 1.

Sixteen (5.1%) of the 314 admissions with matched diagnoses and 9 (18.8%) out of the 47 admissions with unmatched diagnoses were transferred. This difference between the incidences of transfers amongst admissions with matched and unmatched diagnoses was statistically significant ($p=0.001$).

Sixteen patients were transferred to another unit despite of being admitted with a matched diagnosis. Eight were initially admitted to General Medicine, 4 to General Surgery, 3 to Neurology and 1 to Neurosurgery. Fifteen of these admissions required further treatment in the unit they were transferred to. The last patient who was admitted to general medicine for congestive cardiac failure was later transferred to cardiology after he was found to have developed subacute bacterial endocarditis during his admission.

Sixteen of the 70 (24.3%) admission to general surgery had unmatched diagnoses. The number of admissions with unmatched diagnoses to general medicine, neurology, cardiology, and neurosurgery were 17 (13.1%), 8 (29.6%), 4 (22.2%) and 1 (5%) respectively.

There were no unmatched diagnoses for the 77, 3 and 10 admissions to the Orthopaedic, Rheumatology and Geriatric Units respectively. Furthermore, none of these patients were transferred to another unit.

Discussion

The overall rate of matched diagnoses is 86.7%. This is comparable to the 85.1% reported by Goh SH.² The rate of matched diagnoses amongst the medical, general surgical and orthopaedic admissions also compared well with the same study.

There were no unmatched diagnoses for the 77, 3 and 10 admissions to the Orthopaedic, Rheumatology and Geriatric Units respectively. Furthermore, none of

Table 1. Reasons for the unmatched diagnoses.

Admitting unit	Reasons for unmatched diagnoses			Total
	Wrong diagnosis	Diagnosis not obvious initially	No proper history available	
General medicine	5	10	3	18
General surgery	1	15	0	16
Neurology	2	6	0	8
Cardiology	2	2	0	4
Neurosurgery	0	1	0	1
Total	10	34	3	47

these patients were transferred to another unit. This was probably because most admissions to these three units, especially in the case of orthopaedic admissions, were often obvious at presentation. However, the ED doctors missed none of the less obvious problems amongst those patients who were admitted to the Geriatric Unit, as the presentations are often less obvious in the older patients.

Twenty-five (6.9%) of the admissions were transferred. Three of these 25 admissions were transferred because of a wrong diagnosis; one patient who was admitted to the surgery unit with epigastric pain had pneumonia, while the remaining 2 patients who presented with giddiness had a bleeding gastric ulcer and cerebrovascular accident respectively. The rest of the cases had vague presenting complaints, or could not provide a proper history. However, they were still treated by the unit they were admitted to after the actual diagnoses were obtained.

We also found that the incidence of transfers amongst admissions with unmatched diagnoses was significantly higher than those with matched diagnoses. This was because the admissions with unmatched diagnoses were more likely to be admitted to the wrong unit in the first instance.

Of the 16 admissions to surgery with unmatched diagnoses, 7 were admitted for suspected appendicitis. Surgeons as studied by Driscoll³ also experienced difficulty in diagnosing early appendicitis with certainty. In 3 other cases, the patients were admitted for problems of epigastric pain, which turned out to be pneumonia in 2 instances, and antral gastritis in the third case. The rest of the cases presented with vague initial findings that required further investigation before a definitive diagnosis could be obtained. We felt that it was important for us to identify patients who may require any acute surgical intervention, for example in the case of acute abdomen, rather than diagnosing with certainty the exact cause of the presenting complaint. It was also recognised that the brevity of contact time the ED

doctor had with their patients often did not allow them to make certain diagnoses.

Of the 18 patients who were admitted to the medical unit with unmatched diagnoses, 5 had wrong diagnoses, while the remaining cases had vague presenting symptoms. We found that of these 5 cases, 4 had congestive cardiac failure that was wrongly diagnosed as pneumonia, while the last patient had cerebrovascular accident that was missed. This was an area which has to be addressed, so that such discrepant diagnosis would not be missed in the future. The rest of the patients presented with unspecific complaints like sepsis without an obvious source and giddiness. It must be emphasised that it is often difficult to determine the patient's problems initially.

The ED in our hospital and most other hospitals in Singapore will always be faced with the complaint of incorrect diagnoses and inappropriate admissions from our inpatient colleagues. However, O'Connor⁴ had also found that there were no added advantages in having patients reviewed by their inpatient colleagues. Furthermore, there is no doubt that the initial presentation is often not obvious for many diseases and even the best physicians are unable to correctly diagnose many diseases in the first instance.

It is also noteworthy that patients were often managed in a generic manner initially according to the differential diagnoses after obtaining the history and performing the physical examination, and would only be managed in a definitive way after the specific diagnosis is obtained. This is often done with the aid of investigations and repeated reviews of the patient's condition. Therefore, when the doctor in the ED is first faced with the patient, it is often not easy for him to diagnose the patient's condition in a definitive manner.

In the initial contact with the patients in the ED, it is most important for the doctor to recognise that the patient's condition is one that requires further management in the inpatient setting. He must be able

to pick up the ill patient even if the exact cause of his clinical state may not be obvious initially. The fact that only 25 (6.9%) of the 361 admissions were transferred to another inpatient department is sufficient testimony to that.

The doctor in the ED therefore has to acquaint himself with the management policies of his inpatient colleagues. The senior doctor in the ED is required to work with the various senior inpatient staff with regards to the above. Although consultants will have their own preferences, there is a need for some form of standardisation to ensure minimal standards of care. This brings the use of protocols into light. In a resident-based practice, this may be a good bridge to the day of full senior staff consultation. This is especially important for the junior doctors in the ED since there is no doubt that a wrongful discharge is potentially more detrimental than a wrongful admission.

We are also certain that with the advent of short-stay or observation units, the ED physicians would have more contact time with their patients. This will allow ED physicians to arrive at definitive diagnoses in more cases, and they will also be able to manage some of these cases in the short-stay units instead of admitting them.

As we continue with our efforts to improve our services, we see the need for us to look into the areas of our 24-hour revisit rates, the 24-48 hours discharge rate of our admitted patients.² We also recognise the need for all discharges and admissions to be reviewed by the senior staff of the ED.

Conclusion

The doctors in our ED have achieved a high level of diagnostic accuracy. While those patients with unmatched diagnoses are more likely to be transferred, we feel that the overall transfer rate of 6.9% is not high. There are always avenues for us to jointly manage our patients with our inhospital colleagues and for us to continue auditing ourselves.

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