An overview of an emergency department short stay ward in Hong Kong

概述香港一急症室的暫住病房

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Objectives: To describe the structure and service pattern of a short stay ward (SSW) named as Emergency Observation and Pre-admission Ward (EOPW) in Hong Kong. The effectiveness of the EOPW was to be examined. ***Methods:*** This was a retrospective observational cohort study. The facilities, staffing and operation of the EOPW were described. Consecutive patients admitted to the EOPW in the year 2006 were retrieved from the hospital computer database. Admission diagnoses, length of stay (LOS) and destination of disposal were the main outcome variables measured. The ICD coded admission diagnoses were categorised into 24 diagnosis-related groups. Different diagnosis-related groups were compared with respect to the selected efficacy cutoff points of LOS less than 24 hours and hospital admission rate less than 30% respectively. ***Results:*** The service of the 30-bed short stay ward as started in year 2003 was a pilot project in Hong Kong. In year 2006, 10,111 patients were admitted and the mean age was 54.2 years. The five commonest diagnosis-related groups were psychiatric disease, chest pain, dizziness, musculoskeletal pain and poisoning. The overall hospital admission rate and the mean LOS were 26.8% and 23.4 hours respectively and were below the efficacy cutoff points. Musculoskeletal pain, chronic obstructive pulmonary disease and acute urinary retention were the three diagnostic groups with both LOS and hospital admission rate above the efficacy cutoff points. ***Conclusion:*** This first SSW in Hong Kong was demonstrated to be effective according to the analysis result of the 2006 data. SSW has become an integral part of emergency medicine and provided an alternative way of effective management in contrast to traditional inpatient management for various selected disease conditions. (*Hong Kong j.emerg.med.* 2007;14:144-150)

目的：描述香港一間命名為「急症觀察及住院前期病房」的暫住病房之結構及服務模式，並檢視其功效。**方法：**這是一個回顧性的組群觀察研究，描述暫住病房的設施、員工及運作。從醫院的電腦數據庫翻查 2006 年度入住這暫住病房所有的病人。主要量度的結果變數為入院的診斷、住院期及處置目的地。以國際疾病分類編號的入院診斷分類為 24 個診斷相關組。選用住院期少於 24 小時及入院率少於 30% 為個別的功效截止點，以比較不同的診斷相關組。 **結果：**這 30 張病床暫住病房服務是香港從 2003 年開始的一個試驗計劃。在 2006 年，有 10,111 名病者入住這病房，平均年齡為 54.2 歲。最常見的 5 個診斷相關組為精神病、胸痛、頭暈、肌肉骨骼痛及中毒。整體的入院率及平均住院期分別為 26.8% 及 23.4 小時，都在功效截止點以下。肌肉骨骼痛、慢性阻塞性肺病及急性尿瀦留為住院期及入院率都高於功效截止點的 3 個診斷組別。**總結：**根據 2006 年數據分析的結果，展示香港這首間暫住病房是有效的。暫住病房已成為急症醫學整體的一份子，並提供在各種選擇性的病況下，與傳統住院治理成對比的一個有效治理方法的選擇。

Keywords: Diagnosis-related groups, hospital emergency service, length of stay, observation

關鍵詞：診斷相關組、醫院緊急服務、住院期、觀察

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Introduction

Delivery of emergency care has extended beyond the first few hours after the arrival of patients at the accident and emergency department (AED). Such practice is greatly facilitated by the establishment of a

short stay ward (SSW) under the management of emergency physicians. In the United Kingdom, SSW was reported to have been established in 79% of the emergency departments.[1,2] In the United States of America, 18.8% of hospitals had an observation unit.[3] The idea of observation medicine was not new to emergency physicians in Hong Kong. Most AEDs in Hong Kong have designated areas (locally known as 'pending room' or 'observation room') to deliver treatments such as intravenous infusion of fluid to rehydrate patients, to monitor pain relief after the injection of analgesic, and to wait for blood or investigation results. The size of these 'pending rooms' varied from just a small empty cubicle area adjacent to the AED to 'observation rooms' with dozens of beds separated from the AED. These models could be regarded as the prototype forms of SSW in Hong Kong.

We present the local experience of a SSW, named as Emergency Observation and Pre-admission Ward (EOPW), of a regional hospital in Hong Kong. The hospital served a population of about one million, which constituted about 15% of the total population in Hong Kong. We regarded our EOPW, which was set up in the year 2003, as the first AED SSW in Hong Kong because of two reasons. Firstly, back in 2003, all 'pending rooms' or 'observation rooms' had not received additional resources or funding to run such a service. Our EOPW was the first one to receive separate, additional resources and funding. Secondly, our EOPW was the first one to be formally named as a ward by the hospital administrators. Our EOPW could therefore have a staff structure similar to other inpatient wards and enjoy a full range of central supporting services such as meal service.

Our EOPW had a total of 30 beds of which 26 were grouped into 5 big cubicles and the other 4 were in individual rooms with separate bathroom facility and real time video monitoring device. After the SARS epidemic in 2003, the 4 individual rooms were upgraded into isolation rooms with negative pressure ventilation suitable for the management of various infectious diseases including the conduction of nasopharyngeal aspiration tests for various viral agents. The EOPW was staffed with a resident doctor during office hours. Senior emergency physicians would conduct three scheduled ward rounds per day and ad hoc rounds if necessary. The nursing manpower comprised 5 nurses in both morning and afternoon shifts but only 2 in the night shift. Other supporting staff included ward stewards, hospital clinical assistants, phlebotomists, nursing students and security guards. Our EOPW received support from other clinical and paraclinical departments in its daily operation. Daily psychiatric consultation service and physiotherapy were available. Except on Sundays and public holidays, there were daily geriatrician ward rounds for patients from old age homes. Access to radiological investigations like CT brain scan and ultrasound examination was available. Medical social workers provided in-ward assessment for those requiring psychosocial help. Urgent consultation service from specialists of other disciplines was available on a need basis.

The objectives of this study were: (1) to describe the of service of the EOPW in year 2006; and (2) to determine whether our EOPW was effective in terms of shortening hospital length of stay (LOS) and reducing hospital admission rate.

Patients and methods

We conducted a retrospective observational cohort study of consecutive patients admitted in the year 2006 to the EOPW managed by the AED.

Data of the patients managed at the EOPW in year 2006 were retrieved through two electronic databases – Clinical Management System (CMS) and the Accident and Emergency Information System (AEIS) of the Hong Kong Hospital Authority. Patients' age, admission diagnoses, LOS and destination of disposal were the main outcome variables measured. Cases with significant missing data were excluded from analysis. Admission diagnoses were coded according to the International Classification of Diseases, 9th Revision (ICD 9). ICD coded diagnoses were further categorised into 24 diagnosis-related groups (DRGs) to facilitate

interpretation. For example, the DRG of chest pain included acute coronary syndrome, angina, acute myocardial infarction etc. The DRG of musculoskeletal pain included backache, neck pain, sciatica, joint pain, osteoarthritis, gouty arthritis etc. and the DRG of poisoning included acute alcohol intoxication-unspecified, poisoning-sedative/hypnotic etc. All traumatic injuries related to ICD 9 diagnoses were grouped under the DRG of trauma.

The DRGs were analysed in terms of average LOS and rate of subsequent hospital inpatient ward admission. There was no established local efficacy standard on LOS and hospital admission rate for SSW. We selected an efficacy cutoff point of LOS less than 24 hours, the reason being hospital LOS of less than 24 hours was traditionally used by the Hospital Authority as a surrogate marker of 'inappropriate' admission. We selected another efficacy cutoff point of inpatient ward admission rate less than 30% because it was consistent with the existing literature and overseas experiences.[4,5] Several parameters of descriptive statistics were used.

Results

Out of a total of 221,380 AED attendances in the year 2006, 10,111 patients (4.6%) were admitted to the EOPW; of which 680 cases (6.7%) were excluded from analysis because of missing information. The age distribution of all EOPW patients followed a trimodal distribution, with peak age groups at 0 to 9 years, 40 to 49 years and 70 to 79 years (Figure 1). The mean age was 54.2 years (SD = 22.5).

The top 10 commonest DRGs accounted for 70.4% of all patients and they are shown in Figure 2. The average LOS of all DRGs was 23.4 hours. The DRGs of pyelonephritis, skin infection, chronic obstructive pulmonary disease (COPD), pneumonia and lower urinary tract infection had the longest LOS among all DRGs. The DRGs of cardiac rhythm, psychiatric disease, chest pain, abdominal pain and convulsion had the shortest LOS (Figure 3).

The average hospital admission rate from EOPW was 26.8%. Only six DRGs had hospital admission rate

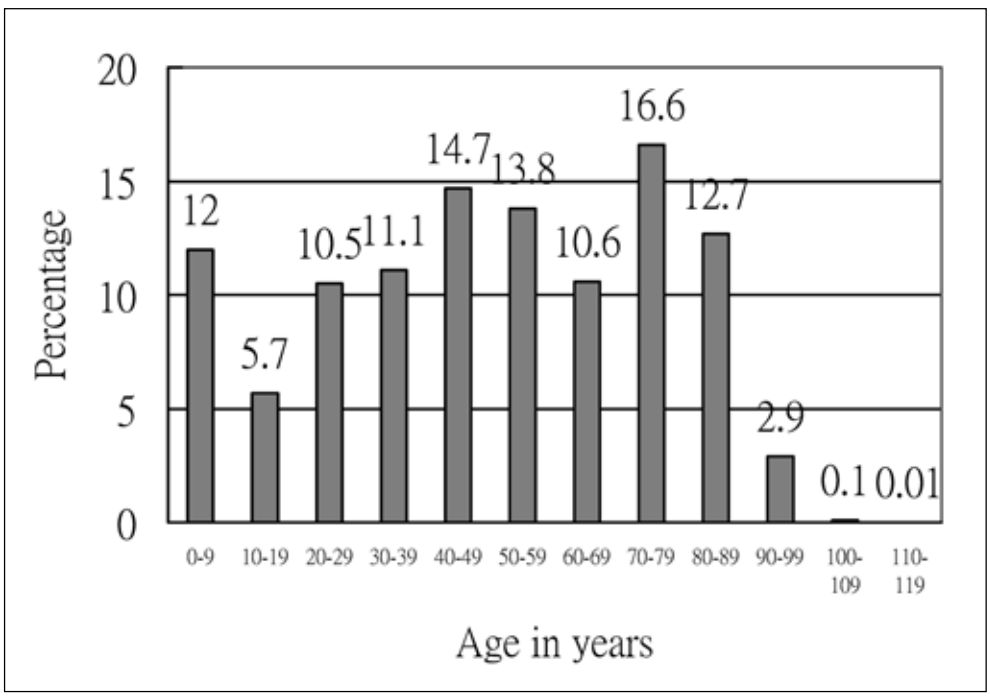
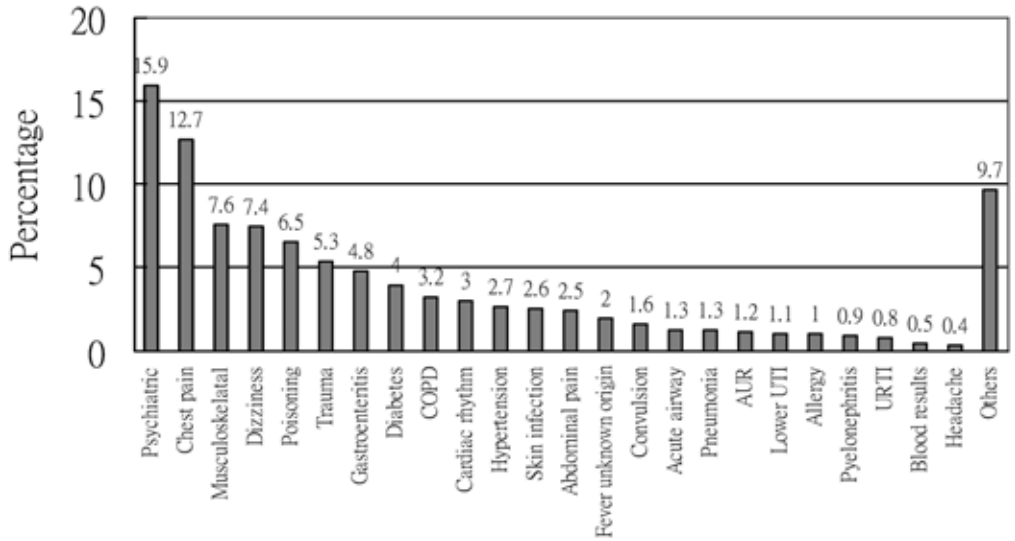
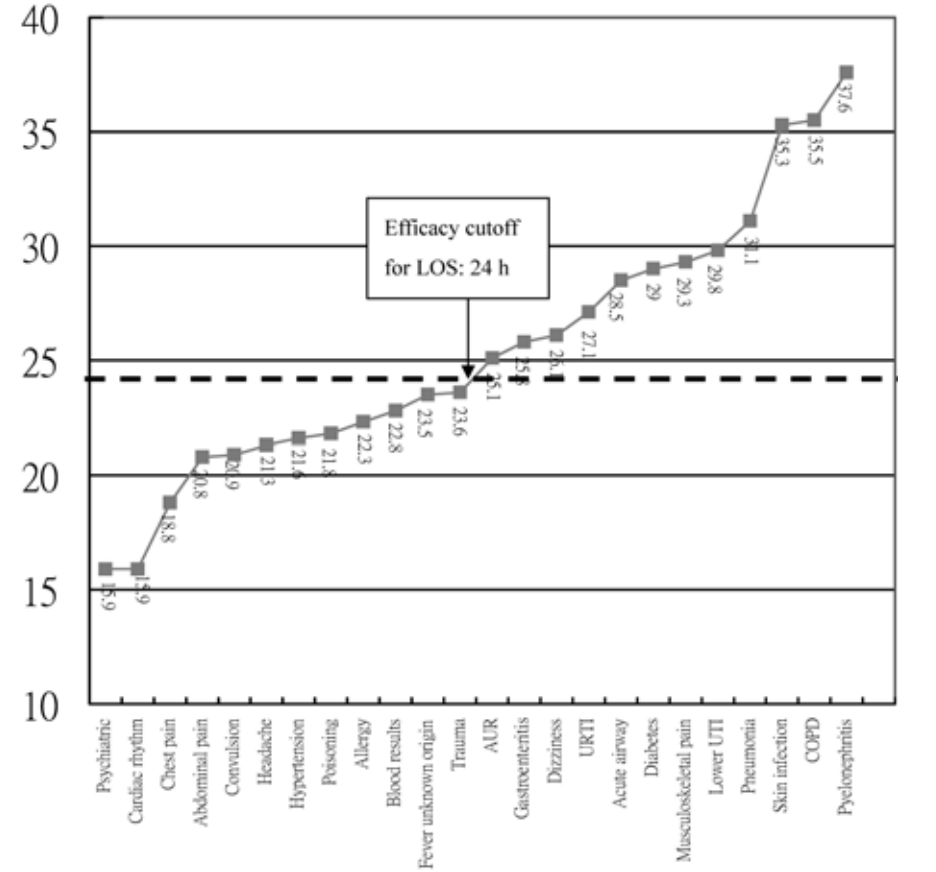


Figure 1. Age distribution of the EOPW patients in 2006.



AUR=Acute urinary retention; COPD=Chronic obstructive pulmonary disease; URTI=Upper respiratory tract infection; UTI=Urinary tract infection

Figure 2. Diagnosis-related group distribution of the EOPW in 2006.



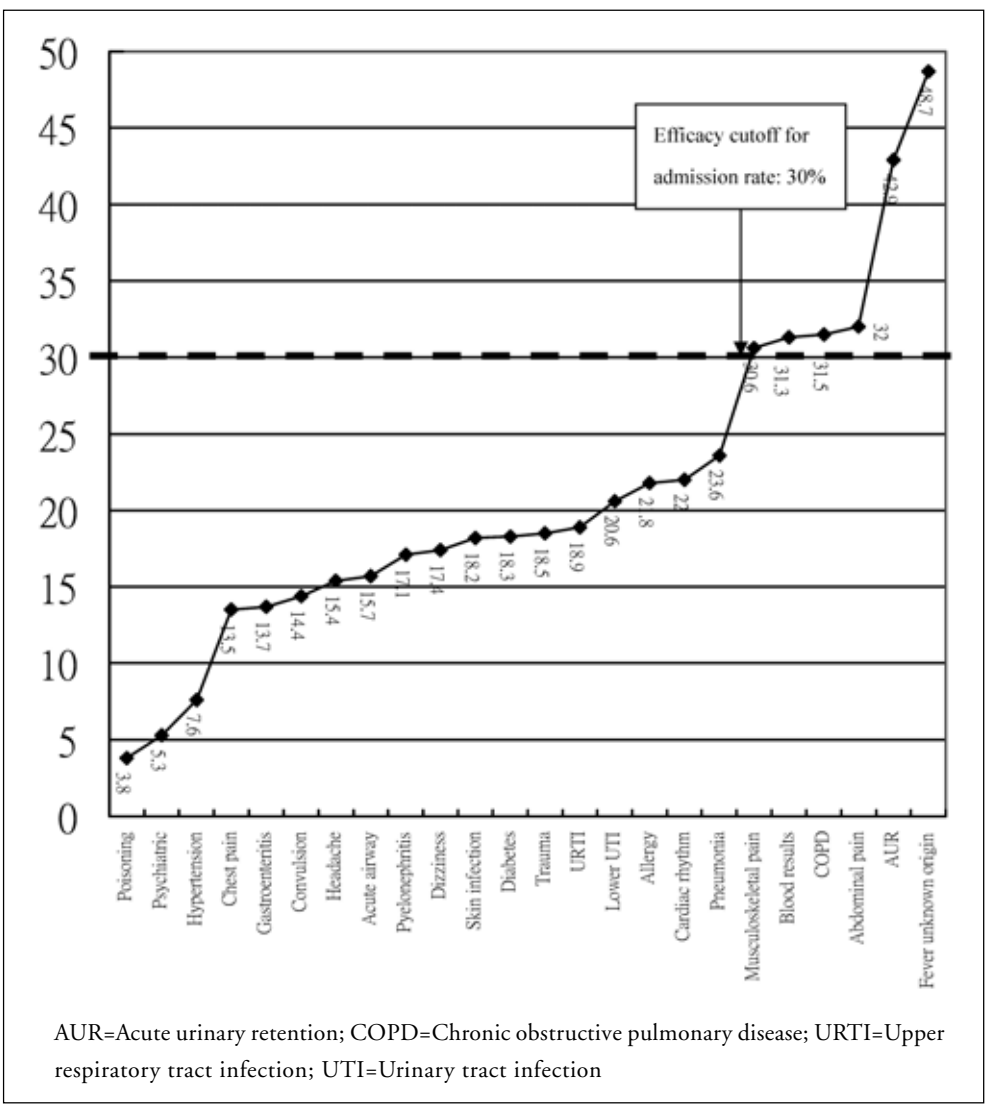
AUR=Acute urinary retention; COPD=Chronic obstructive pulmonary disease; LOS=Length of stay; URTI=Upper respiratory tract infection; UTI=Urinary tract infection

Figure 3. Mean length of stay (hours) of the EOPW diagnosis-related groups in 2006.

above 30%. They were fever of unknown origin (48.7%), acute urinary retention (42.9%), abdominal pain (32%), COPD (31.5%), abnormal blood result (31.3%), and musculoskeletal pain (30.6%) (Figure 4).

Discussion

We described the structure and service pattern of the first local SSW (named as EOPW) in Hong Kong. The size of SSW has been a matter of concern for many investigators. A survey in the United Kingdom reported that their SSWs had a bed number varying between 2 to 20 with annual A&E attendance ranging from 2,440 to 27,250.[2] A national survey of observation units in the United States of America reported 1 to 200 beds per unit with a mean of 10.9; and 91% of them had less than 17 beds.[3] The SSW of the Singapore General Hospital had 40 beds, with an estimated annual attendance number of 5,729 per bed.[6] According to the recommendation of 1 observation bed per 5,000 new patients by the Casualty Surgeons Association,[7] our SSW should have 10 more beds so as to make it around 40 in total. In our experience, as a result of bed constraint, the average occupancy rate of our SSW was very high, reaching more than 90% in most hours. During night time, our SSW was usually full and many patients were unnecessarily admitted to inpatient wards or kept in the AED pending area overnight waiting for a vacant bed in the SSW.



AUR=Acute urinary retention; COPD=Chronic obstructive pulmonary disease; URTI=Upper respiratory tract infection; UTI=Urinary tract infection

Figure 4. Mean own hospital admission rate (percent) of the EOPW diagnosis-related groups in 2006.

The frequency of physician rounds in the SSW has been reported as 1 to 3 times per day.[2] Involvement of experienced physicians in ward round has been described as a key factor for success. Experienced physicians would facilitate earlier detection of serious problems, faster decision making, better patient communication and earlier discharge.[1,2] In our local setting, most AED doctors worked eight hours per shift. As a result, the three senior rounds in our SSW were usually carried out by different physicians. Inconsistent care plan and a tendency to keep patients for a second opinion might have occurred and undermined the turnover rate and efficient use of beds. Strict time frame for LOS e.g. less than or equal to 30 hours, might be a solution. However, the policy would lead to an increase in hospital admission rate from SSW and decrease patient satisfaction as a result of interruption of the continuity of care in the SSW.

Clinical guidelines were invaluable to ensure the delivery of a standardised, high quality care service for several reasons. Firstly, clinical guidelines ensure consistency among junior doctors and nurses in handling complex or rapidly changing conditions. Secondly, evidence based practice could be ensured through well written clinical guidelines. Thirdly, guidelines established through joint effort of different clinical departments create opportunities for mutual understanding. In our SSW, we have implemented clinical guidelines on various disease conditions which include chest pain, hypertensive urgency, COPD, drug overdose, acute abdominal pain, renal colic, acute pyelonephritis, gouty arthritis, acute urinary retention (AUR) etc. We believed that more guidelines should be prepared to cover more common disease conditions for future use.

Appropriate patient selection was critical to maximise effectiveness. Crenshaw et al reported suboptimal patient selection in an emergency department of a teaching hospital in the United States of America. There were both overuse and underuse.[8] Case mix of AED attendance and the scope of service provided in the SSW were determining factors. Our case mix resembled that of Singapore except that we had significantly more psychiatric patients (15.9% vs. 3.2%) but much less cases of acute abdominal pain (2.5% vs. 45.1%).[6] In this study, the LOS of DRG psychiatric patients was among the shortest but the consumption of resources and nursing manpower could be enormous. Managing acute psychiatric patients in a ward fundamentally designed for general purpose has created safety concern. We have had numerous incidents of workplace violence-related injuries to our nursing staff during the management of psychiatric patients. Hence, optimisation of manpower, availability of security guards and training on self-protection techniques are essential in minimising the risks. We could not explain the big difference in the proportion of acute abdominal pain patients treated in our SSW and that of Singapore. Difference in the categorisation method of DRG could not be the sole answer.

In this study, the overall average LOS was found to be 23.4 hours and was just below the efficacy cutoff point of 24 hours. The overall hospital admission rate was found to be 26.8% and was below the efficacy cutoff point of 30%. However, not all DRGs were found to have a value below those efficacy cutoff points. The results might indicate that some disease conditions were less suitable to be managed in the SSW. Musculoskeletal pain which comprised cases of low back pain, sciatica and gouty arthritis, was a typical example. The result was consistent with the findings of other studies. Ross et al reported that the admission rate for the elderly with back pain was greater than 30%, and up to 45.8% for those older than 85 years. They also demonstrated that this group had the longest LOS among all DRGs.[9] Another example was COPD patients. Both our study and that of Ross et al[9] demonstrated that COPD patients had a long LOS and high hospital admission rate. Patients with AUR also had a LOS slightly greater than 24 hours and an admission rate more than 30%.

However upon critical analysis, the root cause of long LOS was related to the treatment itself. In our treatment protocol, we started terazosin hydrochloride treatment mostly at bedtime and intended to observe the patients for more than 12 hours post-treatment to rule out acute haemodynamic complications. As a result, most patients had to spend more than 24 hours in the SSW before discharge with further doses of terazosin. The high admission rate for AUR patients was related to the frequent occurrence of acute

haemodynamic complications or persistent gross haematuria after catheterisation. We still believe that AUR patients are potential candidates for SSW management if we could have access to other highly selective adrenergic-blockers with less haemodynamic effects. Patients with pyelonephritis were found to have the longest LOS in this study. However, we are of the opinion that they are still suitable candidates for our SSW because of the relatively low hospital admission rate. In this study, patients with chest pain had a LOS of 18.8 hours which was slightly longer than the findings in other studies (11.9 to 15.7 hours).[4,5] This could be related to our local practice of measuring two troponin T levels 12 hours apart. Our patients with poisoning had a low admission rate of 3.8% because they usually took benzodiazepines, paracetamol or ethanol at a less lethal dose. The results compared well with the figure of 3% reported in another study.[10]

Limitation

Our study was not without limitations. Firstly, we only reported mean or average LOS for various DRGs. However mean value may be subjected to distortion by extreme values. We could not provide readers with median values because of the intrinsic limitation of the AEIS in the calculation of time data. Secondly, most of the case mix information was retrieved from the computer database known as CMS. However, a small proportion of cases had information missing in the CMS and we were forced to use the AEIS data as a substitute. Although the two systems should be complementary to each other, discrepancies did exist. We had adopted a very careful approach to ensure the accuracy of the collected data and therefore excluded all cases with significant missing information or discrepancies. Thirdly, the performance of our SSW during the pertinent period was affected by situations not taken into account, including fluctuation of staff manpower, introduction of new department policies or clinical guidelines, change of community health services and possibly alteration of case mix. Fourthly, the ICD 9 had inherent problems of interpersonal coding bias. Further categorisation of ICD coded diagnoses into DRGs could have introduced a second level of error.

Conclusion

Despite the limitations, we demonstrated that both the average LOS and hospital admission rate of patients managed in our SSW were below the efficacy cutoff points. The results indicated that this first SSW in Hong Kong was effective. We identified that DRGs of musculoskeletal pain and COPD were less optimal to be managed in the SSW. We described several potential developments in the local SSW. We believed that SSW could be an integral part of emergency medicine and could provide an alternative way of effective management in contrast to traditional inpatient management for various selected disease conditions.

References

1. Cooke MW, Higgins J, Kidd P. Use of emergency observation and assessment wards: a systematic literature review. Emerg Med J 2003;20(2):138-42.
2. Goodacre SW. Role of the short stay observation ward in accident and emergency departments in the United Kingdom. J Accid Emerg Med 1998;15(1):26-30.
3. Mace SE, Graff L, Mikhail M, Ross M. A national survey of observation units in the United States. Am J Emerg Med 2003;21(7):529-33.
4. Zalenski RJ, Rydman RJ, McCarren M, Roberts RR, Jovanovic B, Das K, et al. Feasibility of a rapid diagnostic protocol for an emergency department chest pain unit. Ann Emerg Med 1997;29(1):99-108.
5. Gomez MA, Anderson JL, Karagounis LA, Muhlestein JB, Mooers FB. An emergency department-based protocol for rapidly ruling out myocardial ischemia reduces hospital time and expense: results of a randomized study (ROMIO). J Am Coll Cardiol 1996; 28(1):25-33.
6. Lateef F, Anantharaman V. The short-stay emergency observation ward is here to stay. Am J Emerg Med 2000; 18(5):629-34.
7. Clinical Services Standing Committee of the Casualty Surgeons Association. Accident and Emergency Ward Report. UK: Casualty Surgeons Association; 1989 Mar.
8. Crenshaw LA, Lindsell CJ, Storrow AB, Lyons MS. An evaluation of emergency physician selection of observation unit patients. Am J Emerg Med 2006;24 (3):271-9.
9. Ross MA, Compton S, Richardson D, Jones R, Nittis T, Wilson A. The use and effectiveness of an emergency department observation unit for elderly patients. Ann Emerg Med 2003;41(5):668-77.
10. Hodgkinson DW, Jellett LB, Ashby RH. A review of the management of oral drug overdose in the Accident and Emergency Department of the Royal Brisbane Hospital. Arch Emerg Med 1991;8(1):8-16.