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A1

A RETROSPECTIVE REVIEW ON RESOURCES IMPLICATION OF INTER-FACILITY TRANSPORT IN EMERGENCY DEPARTMENT

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Introduction: The Inter-facility Transport (IFT) service provided by emergency departments becomes increasingly important. Patients need to be rapidly transported over short distances to access appropriate health care facilities.

Objectives: This study aimed (1) to examine the resources utilization of IFT accompanied by emergency staff; (2) to analyze the crude cost, fixed and variable cost of IFT; (3) to forecast the budget plan for hospital administrators in future development.

Methods: It was a retrospective record review on all IFT accompanied by emergency staff from 1st January 2006 to 31st December 2008. The data collected included indication of escort, provisional diagnosis, patient outcome, transport equipment, transport personnel, transport service time, and taxi fare for return journey. Descriptive analysis was used to evaluate the crude cost, fixed and variable cost per year in providing IFT service by the emergency department.

Results: There were 337 transports in total accompanied by either medical or nursing staff of the emergency department that accounted for 2.05% of all IFT. The commonest indication of mobilizing the transport team was unstable clinical condition that required neurosurgical specialty care. The average transport service time was 57.7 minutes per transport (SD 11.03). The median length of stay in hospital was 7 days, ranging from 1 to 1057 days. The hospital mortality was 20.2%. The resources utilization consisted of fixed and variable cost. Fixed cost included transport equipment, mobile phone and the Inter-facility and Critical Care Transport Medicine (ICCTM) training course. The variable cost included direct time cost (hourly wages of medical or nursing staff times transport service time), transport cost for return journey and opportunity cost of transport personnel. This summed up to a cost of \$37,518 per year and the crude cost of providing IFT service by the emergency department was \$852 per patient.

Conclusions: The major cost drivers for IFT were the number of transport, direct time cost and transport cost for the return journey. The crude cost of providing IFT service by the emergency department was reasonable and acceptable. However, there was a challenge to hospital administrators

to balance the cost-benefit ratio so as to consolidate the future direction and development of IFT service.

A2

LOW FALL-RELATED INJURIES AND OUTCOMES IN HONG KONG TRAUMA CENTRES

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Objectives: To study the associations between the different characteristics of major low fall-related injuries and the mortality or length of hospital stay (LOS) in survivors.

Material: Major trauma patients with low fall as injury mechanism attending the five designated Hong Kong trauma centres.

Methods: A retrospective study based on the 2007 trauma registry. Characteristics of victims (age [<65 or ≥ 65 years], gender [male or female], past health status [healthy or with pre-existing illness]), environmental characteristics (locations [home/industrial premises/place for recreation/street/public building/residential institution/others], height of fall [ground or <1 meter]), injury characteristics (presence of injured body part [head/face/thorax/abdomen/extremities/external] with AIS ≥ 3 [yes or no], ISS [<15 or ≥ 15], multiple injury [yes or no]) and treatment characteristics (trauma centres [5 hospitals], intensive care unit (ICU)/high dependency unit (HDU) admission [yes or no]) were collected as the predictive variables. Outcomes measured were mortality (yes or no) and length of stay (LOS) (≤ 1 week or >1 week). Binary logistic regression was used for analysis with p taken at 5% level. Goodness-of-fit was tested by Hosmer and Lemeshow Test.

Results: 514 cases of major low fall-related injuries were identified out of 863 all fall-related injuries enrolled in the trauma registry of the five centres under the same set of inclusion criteria. Only 502 cases were included into analysis after excluding 12 cases with missing data. Major low fall injuries occurred more frequently in male (M:F=1.5:1), elderly patients (≥ 65 : <65 =1.2:1) and at home (37.3%, 187/502). The mortality rate was 12.0% (60/502). The range of LOS was 0-267 days with median=6.7 days in survivors. Five variables significantly predicted a higher risk of mortality: (1) pre-existing medical illness (OR=3.22, 95%CI=1.34,

7.75, $p=0.009$), (2) age ≥ 65 years (OR=3.60, 95%CI=1.49, 8.70, $p=0.005$), (3) ISS ≥ 15 (OR=19.23, 95%CI=5.89, 62.50, $p=0.000$), (4) ICU/HDU admission (OR=2.73, 95%CI=1.38, 5.41, $p=0.004$) and (5) extremities injury with AIS ≥ 3 (OR=4.31, 95%CI=1.10, 16.95, $p=0.036$). Six variables were significantly associated with a longer LOS (>1 week) in survivors: (1) hospitals ($p=0.014$, $df=4$), (2) head injury with AIS ≥ 3 (OR=4.63, 95%CI=2.20, 9.73, $p=0.000$), (3) abdominal injury with AIS ≥ 3 (OR=6.34, 95%CI=1.02, 39.30, $p=0.047$), (4) extremities injury with AIS ≥ 3 (OR=9.18, 95%CI=4.61, 18.29, $p=0.000$), (5) age ≥ 65 (OR=2.89, 95%CI=1.75, 4.78, $p=0.000$), (6) ICU/HDU admission (OR=5.40, 95%CI=2.75, 10.61, $p=0.000$). Both regression models passed the goodness-of-fit test below 5% significance. **Conclusions:** Old age (≥ 65) is an independent predictor for an adverse outcome after major low-fall injury, including a higher chance of mortality and longer hospital stay (>1 week). Fall prevention program should focus on educating elderly patients, particularly those with pre-existing medical illnesses.

A3

EFFECT OF A RAMPED POSITION ON EASE OF ENDOTRACHEAL INTUBATION BY NOVICE INTUBATORS: RANDOMISED CROSSOVER TRIAL

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Objective: To compare laryngoscopy with a Macintosh blade to Glidescope with respect to the time to successful tracheal intubation, the percentage of glottic opening (POGO) score (video laryngoscope only) and the rate of complications, in both the supine and elevated (ramped) position using a commercially available mattress system (The Airpal®).

Methods: 75 novice intubators (first-year medical students) attempted intubation on Human Patient Simulator (METI) with a 'normal airway' (Grade 1 Cormack-Lehane view) in both positions using both laryngoscopes. The POGO score was estimated by the intubator during intubation. The time to intubation and the rate of complications (oesophageal intubation and dental trauma) were measured and compared. The time and POGO results were analysed using a two sample t-test and categorical results by the chi square test.

Results: There was no difference in the mean time to intubate in either positions ($p=0.33$). Intubation using the Macintosh laryngoscope was significantly faster than the video laryngoscope (mean difference 1.5 minutes, $p<0.001$). The view produced by video laryngoscope (mean POGO score) was 8% better in the elevated position than the supine position ($p=0.018$, t-test). The oesophageal intubation rate for the Macintosh laryngoscope was 15-17% compared to only 1-3% for the video laryngoscope, but dental trauma occurred in 53-56% of video laryngoscopies compared to only 2-6% of Macintosh laryngoscopies (all $p<0.001$).

Conclusion: Novice intubators should start intubation with Macintosh laryngoscope instead of Glidescope. Higher oesophageal intubation rate can be remedied by prompt and proper position confirmation. The Airpal® can be considered for better laryngoscopic view.

A4

HOW MUCH DO EMERGENCY PHYSICIANS KNOW ABOUT COMMON LEGAL SITUATIONS?

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Aims: (1) To determine the extent of emergency physicians' knowledge of common legal issues involved in emergency care, and (2) To assess whether experience and training improved this knowledge.

Methods: A standardized structured questionnaire was developed exploring common legal issues in emergency departments, namely end-of-life care, mental health and infection control laws, professional responsibility/accountability, and employment issues. Basic demographic data were recorded. Questionnaires were sent to all fellows and trainees of the Hong Kong College of Emergency Medicine.

Results: Questionnaires were completed by 63/434 (15%) doctors, 36 fellows and 27 trainees. Sixty of 63 respondents worked in the public sector. Twenty-five percent of trainees and 87% of fellows were not aware of the Bolam principle. Thirty-eight percent of trainees and 48% of fellows recognize compellability of witness in court. Only 19% of trainees and 23% of fellows recognize that it is a criminal offence if they fail to report any scheduled infectious disease. Forty-three percent of trainees correctly identified the high threshold of confidentiality imposed on doctors. Most fellows knew vicarious liability in workplace violence, the confidentiality of doctors who themselves had HIV, and employer's rights, which were generally weak among trainees. Fifty-five percent fellows and 48% trainees correctly identified their right to apply for involuntary admission under the Mental Health Ordinance. Eighty-one percent of trainees and 90% of fellows correctly recognized and respected the competence of stable psychiatric patients for their autonomy. Twenty-nine percent of trainees and 52% of fellows agreed that when patients were not competent to give consent, then doctors should practice for the patients' benefit, rather than seeking the relatives' opinion. Sixty-two percent of trainees and 84% of fellows understood *Chester v Afsgar* (2004) in UK. Fellows (66.3%) generally scored higher than trainees (51.7%) in the questions.

Conclusion: Emergency physicians frequently encounter difficult medico-legal situations but their relevant knowledge is insufficient. Training in legal issues relevant to emergency medicine should be further improved.

A5

CAPILLARY REFILL TIME IN HEALTHY CHINESE CHILDREN

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Introduction: Capillary refill time (CRT) is often used in the assessment of sick children, peripherally (e.g. fingertip) or centrally (e.g. forehead). Two seconds is considered

the limit of normal. The test has been criticised for poor inter-observer reliability. However, it is not known whether this is true in Chinese children, nor what the normal range is.

Objectives: To determine the normal range of CRT in healthy Chinese children. To compare centrally and peripherally measured CRT. To determine inter-observer reliability.

Materials and methods: This was a population-based observational study with ethical approval from the Chinese University of Hong Kong and 1374 Chinese children, 0-12 years old, in schools and kindergartens in Hong Kong. Forehead and right index fingertip CRT were measured in all children using a digital stopwatch. The observer applied digital pressure for five seconds, and started the stopwatch as pressure was removed. The stopwatch was stopped as soon as the observer considered skin colour to have returned to normal. In 185 subjects a second blinded observer repeated the test immediately. Body temperature and routine physiological and anthropometric measurements were also performed. Central-peripheral and inter-observer variability was assessed with Bland Altman plots, and kappa scores for agreement of CRT "<2 seconds" vs. ">2 seconds".

Results: CRT was distributed about a mean of 1 second; fewer than 2% of CRTs were longer than 2 seconds. However, Bland Altman plots demonstrated wide inter-observer, and intra-observer central-peripheral, variability. Using a cut-off of 2 seconds, fingertip inter-observer agreement was fair (kappa=0.27). There was no agreement for inter-observer forehead CRT (kappa=0.0) nor for central-peripheral intra-observer CRT (kappa=-0.01). There was no significant association of CRT and body temperature, nor with any other physiological or anthropometric measurements.

Conclusions: Two seconds is a reasonable practical limit for CRT in healthy Chinese children. However, the test shows marked variability between observers.

A6

ALCOHOL MISUSE IS RARE AMONG HONG KONG MEDICAL STUDENTS AND EMERGENCY DEPARTMENT PATIENTS

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Introduction: Many studies have found high levels of hazardous or excess alcohol use among university students, particularly medical students, and among patients attending emergency departments (ED). The Alcohol Use Disorders Identification Test (AUDIT) developed by the WHO identifies potential alcohol problems. Scored out of 40, 1-7 is considered safe drinking, 8-15 as exceeding safe usage guidelines, and 16+ as hazardous. To our knowledge, AUDIT has not been used to assess drinking levels in Hong Kong patients or medical students.

Objective: To determine and compare the degree of self-

reported alcohol use among: (A) ED patients and (B) medical students in Hong Kong, and to compare this with published data from UK medical students.

Materials and methods: We used the AUDIT questionnaire survey: (A) Translated into Chinese and distributed by one researcher at different times of the day, to 277 walk-in patients in the ED waiting-room in the Prince of Wales Hospital, Hong Kong, between December 2008 and January 2009. (B) In English, distributed online with email reminders, to all 137 final year medical students from the Chinese University of Hong Kong, conducted between August and October 2008. Two UK studies of AUDIT scores in medical students (in Belfast, 1997; and in London, 2001) were used for comparison.

Results: 183 patients and 111 students completed the AUDIT forms; response rates 66%, 81% respectively. Mean (SD), median (IQR) AUDIT scores: patients 1.96 (3.05), 1 (0-3); students 1.8 (2.15), 1 (0-2). More students than patients drink some alcohol (73.9% vs. 56.3%, p=0.0037). Few subjects reported excess and hazardous scores: patients 4.9%, 0.5%; students 1.8%, 0.0%. This was far less than in the UK studies in which 42.7% of medical students drank excessively (p<0.00001).

Conclusions: Although most students and patients in Hong Kong drink some alcohol, alcohol misuse as measured by AUDIT is rare, and much lower than has been found in the West, despite the relative inexpensiveness of alcohol.

A7

COMPARISON BETWEEN JUC SPRAY AND SILVER SULPHADIAZINE CREAM DRESSING IN THE MANAGEMENT OF SECOND DEGREE BURN WOUNDS IN AN ACCIDENT AND EMERGENCY DEPARTMENT IN HONG KONG

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Objectives: This study was to evaluate the effect of JUC antimicrobial spray dressing (JUC 抗菌噴霧敷料) in the management of second degree burn wound in accident and emergency department (AED) patients in comparison to traditional silver sulphadiazine (AgS) cream dressing.

Research design and methods: This was a randomized controlled trial study conducted between 1st November 2008 to 30th May 2009 in Ruttonjee and Tang Shiu Kin Hospital AED. Patients with second degree burn less than 5% body surface area over the limbs or anterior trunk, aged 18 years or above and independent in daily activities were recruited in this study. The patients included in the study were randomized into two groups – one group used JUC spray and the other AgS cream. The technique of using JUC spray dressing at home was explained by nurses to those patients in the JUC group and they continued such dressing at home. AgS cream dressing was given to the 2nd group of patients for comparison. This group of patients continued to be dressed in the general outpatient clinics. Follow-ups

in the AED were arranged for both groups of patients on Day 5, 10 and 14. The wounds were then assessed by doctors who did not have prior knowledge of the initial treatment. The wound infection rate was the primary outcome to be measured. Healing rate, treatment cost and acceptability of the JUC spray by the AED patients were also studied.

Results: 60 subjects were recruited into the study with 30 subjects in each group. There was no significant difference in basic characteristics between the two groups. There were two patients with infection in the AgS group but none in the JUC group ($p=0.492$). There were 21 patients in the JUC group with healing between Day 5 and Day 10 compared to 22 patients in the AgS group ($p=0.346$). All patients in the JUC group accepted the JUC spray as a treatment for their burn wounds.

Conclusions: Our results suggested that there was no significant difference in the infection rate and healing time between JUC spray and AgS cream in the treatment of second degree burn wounds in AED patients. However, JUC spray was highly accepted by the patients and it is recommended that it could be used as an alternative treatment for second degree burn wounds in AED patients.

A8

THE BROSELOW TAPE IS NOT SUITABLE FOR USE IN CHINESE CHILDREN OVER 10 YEARS OLD

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Introduction: The Broselow tape has previously been found to provide the most accurate estimate of children's weight in Hong Kong, but it is not known how many children fall outside the range of the tape, nor whether such children can be assumed to be of adult weight, nor how otherwise to estimate the weight of children in the "Broselow-unsuitable" group.

Objectives: To determine what proportion of children in different age groups falls outside the limits of the Broselow tape, how their weight compares with adults, and what correlates most strongly with weight in these children.

Materials and methods: Population-based observational study, with ethical approval from the Chinese University of Hong Kong. One thousand three hundred and seventy-seven Chinese children (55% boys), 0-11.9 years old, from schools and kindergartens in Hong Kong. Weight was measured to the nearest 0.2 kg; height, foot-length and mid-arm circumference to the nearest 0.1 cm. The proportion of children who fell outside the height range of the Broselow tape was determined. The weights of these children were compared with recently published data for 759 Hong Kong 18-year-old using the one-sided t-test. Correlation coefficients (r) were calculated to determine the relationship with weight for each of the other parameters.

Results: 42.4% of 10-year-old and 70.2% of 11-year-old were too tall for the tape. In the 172 children overall who

were too tall for the tape, mean (SD) weight was 43.1 (8.5) kg. Mean weight of 18-year-old was 56.7 kg; mean difference 13.6 kg ($p<0.0001$), or 32%. The strongest correlate with weight in the children too tall for the tape was mid-arm circumference ($r=0.912$).

Conclusions: The Broselow tape is inappropriate for use in children over 10 years old. Children too tall for the tape cannot be assumed to be of adult weight; using adult doses of drugs and fluids could imply an average overdose of 32%. The parameter correlating most strongly with weight in these children is mid-arm circumference; weight estimates should therefore be based on mid-arm circumference in older children.

A9

THE PERFORMANCE OF PROGNOSTIC SCORES IN PREDICTING OUTCOME FOR CRITICALLY-ILL PATIENTS IN THE EMERGENCY DEPARTMENT

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Introduction: The Prince of Wales Emergency Department Score (PEDS) was developed to predict likelihood of mortality and evaluate the intensive care needs of undifferentiated patients presenting to the resuscitation room. PEDS is specific for critically-ill emergency department (ED) patients and could aid in triage for intensive care unit admission.

Objectives: To validate and refine PEDS, and compare its performance with six previously-published scores for risk-stratifying critically-ill ED patients: MEDS (Mortality in the Emergency Department Sepsis), MEES (Mainz Emergency Evaluation Score), MEWS (Modified Early Warning Score), Simple Clinical Score (SCS), WPSS (Worthing Physiological Scoring System), and REMS (Rapid Emergency Medicine Score).

Materials and methods: Prospective observational study in the ED of the Prince of Wales Hospital in Hong Kong. Two hundred thirty-nine consecutive adult patients of triage category 1 and 2, presenting to the resuscitation room from 9 am-5 pm, Monday-Friday, September 2008-February 2009. Physiological, point-of-care, laboratory, radiological, and demographic data to calculate all scores were collected. The primary outcome was a composite of 7-day mortality and/or intensive care admission.

Results: Area under receiver operating characteristic curve (AUROC) for PEDS validation cohort: 0.784 (95%CI 0.726-0.834); refined PEDS: 0.795 (95%CI 0.734-0.844); MEDS: 0.585 (95%CI 0.520-0.648) $p<0.001$; MEES: 0.731 (95%CI 0.670-0.786) $p=0.202$; MEWS: 0.744 (95%CI 0.684-0.798) $p=0.328$; SCS: 0.721 (95%CI 0.660-0.777) $p=0.133$; WPSS: 0.749 (95%CI 0.689-0.802) $p=0.328$; REMS: 0.721 (95%CI 0.660-0.770) $p=0.176$. (p -values for significance-of-difference from refined PEDS).

Conclusions: The performance of all scores deteriorated when prospectively validated. Refined PEDS performed best;

but was not significantly better than the other scores, except MEDS. Refined PEDS appears promising as a helpful adjunct to subjective clinical opinion.

A10

PHYSICIANS' JUDGMENT IS BETTER THAN PROGNOSTIC SCORES IN PREDICTING OUTCOME FOR CRITICALLY-ILL PATIENTS IN THE EMERGENCY DEPARTMENT

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Introduction: The Prince of Wales Emergency Department Score (PEDS) was developed as an objective tool to guide management and intensive care referral from the emergency department (ED), but although this score outperformed other objective scoring tools, it is not known whether it is better than ED physician judgment.

Objectives: To compare PEDS with physician judgment in the evaluation of critically-ill patients.

Materials and methods: Prospective observational study in the ED of the Prince of Wales Hospital in Hong Kong. One hundred and fifteen patients presenting to the resuscitation room from 9 am-5 pm, Monday-Friday, September 2008 to February 2009. Clinical data to calculate the PEDS score was collected. The primary attending ED physician was asked to estimate the patient's 7-day survival and need for intensive care. The primary outcome was a composite of 7-day mortality and/or intensive care unit (ICU) admission, and secondary outcomes were 7-day mortality and ICU admission separately.

Results: Physician judgment: sensitivity=68.75%, specificity=80.81%, positive predictive value (PPV)=45.83, negative predictive value (NPV)=94.12, accuracy=79.13%. PEDS: sensitivity=82.05%, specificity=71.19%, PPV=38.55, NPV=94.74, accuracy=66.11%. Physician prediction of composite outcome of 7-day mortality and/or ICU admission: area under receiver operating characteristic curve (AUROC), 0.773±0.0718 (95% CI 0.686-0.846); AUROC of PEDS: 0.795±0.0428 (95% CI 0.738-0.844).

Conclusion: Physicians' judgment regarding patient's survival and need for intensive care appears superior to predictive models.

A11

THE RANGE OF NORMAL VITAL SIGNS IN CHINESE CHILDREN IS SIGNIFICANTLY DIFFERENT FROM THE VALUES IN APLS

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Objectives: To describe normal ranges for heart rate (HR), systolic blood pressure (BP) and respiratory rate (RR) in Chinese children, and to compare them with the tables

published in Advanced Pediatric Life Support (APLS), Advanced Trauma Life Support (ATLS) and on the Broselow tape.

Materials and methods: Population-based observational study. One thousand three hundred and ninety-three children (55% boys), 1-11.9 years old in primary schools and kindergartens in Hong Kong. HR and BP were measured by standard oscillometry. RR was measured visually over one minute. Derived normal ranges were calculated for each parameter, defined as lying within 2 standard deviations of the mean. One-sample t-test was used for comparison with APLS means.

Results: For HR, BP and RR respectively, 33%, 55% and 56% of the measurements were outside the normal ranges described by APLS. Upper limits of RR and HR, and lower limits of BP were comparable to ATLS, APLS and Broselow tables. Lower limits of RR and HR were lower, and the upper limit of BP higher, than in the other tables. In preschool and school groups, the mean difference between Chinese subjects and APLS ranges was highly statistically significant ($p < 0.0001$).

Conclusions: Normal vital signs in Hong Kong Chinese children are significantly different from those described in APLS. Tables of normal ranges derived from Chinese children would be more appropriate for use in Chinese emergency departments, and may also better reflect normal values in other Asian countries (see table below).

Table of approximate normal values for vital signs in Hong Kong Chinese children

Age group	Age (years)	HR	SBP	RR
Infant	0-0.9	95-180	65-105	30-45
Toddler	1-2.9	80-145	75-110	15-40
Pre-school	3-5.9	70-120	80-125	15-30
School	6-11.9	60-115	90-140	15-30

A12

CHILDREN'S WEIGHTS CORRELATE MORE STRONGLY WITH MID-ARM CIRCUMFERENCE THAN WITH AGE, HEIGHT OR FOOT-LENGTH

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Introduction: Rapid and accurate estimation of a child's weight is often necessary when time is limited to provide appropriate drug and fluid doses. Commonly used methods of weight estimation use height or age-based calculations. It is not known which method is most accurate in Chinese children.

Objectives: To determine which of the following parameters most strongly correlates with weight: age, height, foot-length, mid-arm circumference (MAC) and to derive new weight estimation formulae.

Materials and methods: Population-based observational study. 1368 Chinese children (752 boys, 616 girls), 1-11.9

years old, in schools and kindergartens in Hong Kong. Height, foot-length and MAC were measured to 0.1 cm, weight to 0.2 kg. Correlation coefficients (r) for weight were calculated with each parameter. Subgroups were analysed according to the age groups in ATLS: toddler (1-2.9 years), preschool (3-5.9 years), school-age (6-11.9 years). Linear regression was used to derive formulae for weight estimation. Bland Altman plots were used to assess the precision of age-based, height-based and MAC-based weight estimations.

Results: Overall, and in pre-school and school-age children separately, weight was correlated more strongly with MAC than with any of the other parameters. In toddlers, weight did not correlate with any parameter significantly more strongly than with any other. Age was related to weight according to the formula: Weight in kg = (Age x 3) + 5. MAC was related according to the formula: Weight = (MAC - 10) x 3. Although the Broselow tape was superior to MAC-based estimation in younger children, there was no difference in bias or precision in school age children.

Conclusions: Weight correlates with MAC more strongly than with age, height or foot-length. Estimates of children's weight could be based on mid-arm circumference: $W = (MAC - 10) \times 3$. We propose using a purpose-made arm tape which could be used in conjunction with the Broselow colour-coded system. This would be especially useful for older children.

A13

CHILDREN'S DISCOMFORT DURING ULTRASOUND CARDIAC OUTPUT MONITORING (USCOM) IS SIMILAR TO THAT DURING BLOOD PRESSURE MEASUREMENT

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Introduction: The Ultrasound Cardiac Output Monitor (USCOM) provides a non-invasive Doppler ultrasound measure of cardiac output and other cardiovascular parameters. USCOM involves placing a probe in the suprasternal notch with some pressure, and this could potentially cause children some distress.

Objectives: To compare the degree of discomfort experienced by children during an USCOM scan with that experienced during standard non-invasive oscillometric blood pressure (BP) measurement.

Materials and methods: Prospective observational comparative study; 254 Chinese children (131 boys, 123 girls), aged 3-12 years old (mean 7.9, SD 2.4) in primary schools and kindergartens in Hong Kong. The Wong-Baker faces 5-point pain scale (0=no pain, 5=hurts worst) was used to assess discomfort following blood pressure and USCOM measurements. Pain scores were compared using the Wilcoxon signed rank test, 95% confidence intervals with the t-test. A pain score difference of 1 was considered clinically relevant.

Results: USCOM was associated with a statistically

significant ($p < 0.0001$) but clinically irrelevant difference in pain scores (0.36). This difference was larger but still clinically irrelevant in children over 7 years old (0.49). In younger children there was no difference between USCOM and BP pain scores. There were no significant differences between boys and girls.

Conclusions: There is no clinically relevant difference in the discomfort experienced by children, between USCOM and blood pressure measurement.

A14

A NEW METHOD TO SCORE THE QUALITY OF USCOM SCANS

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Objectives: To describe a new method of scoring USCOM (Ultrasound Cardiac Output Monitor) traces, and relate this to operators' learning curves and to the precision of measured stroke volume.

Materials and methods: 654 children aged 4-12 (54% male) in Hong Kong primary schools and kindergartens. USCOM was performed twice on all subjects by two independent, blinded operators. Each USCOM scan was later scored by a single observer. Outcome measures: cumulative average scores, number of unsupervised scans required to reach cumulative average score, and Bland Altman Plots for interobserver precision of stroke volume measurement.

Results: 30-40 unsupervised scans were required for operators to reach their cumulative average scan quality. Of scans considered acceptable quality (score of 8/12 or above), Bland Altman limits of agreement were -17.3% to 20.7%.

Conclusions: Using the proposed scoring system, new USCOM operators will require 30-40 scans for proficiency. A cut-off score of 8/12 is proposed as a definition of an acceptable scan.

Criterion	2 points	1 point	0 point
Upstroke	Well-defined on all 3 peaks	Slightly blurry in one or more peaks	Very blurry in one or more peaks
Downstroke	Well-defined on all 3 peaks	Slightly blurry in one or more peaks	Very blurry in one or more peaks
Apex	Well-defined on all 3 peaks	Slightly blurry in one or more peaks	Very blurry in one or more peaks
Area	Entire area is shaded blue	Mostly blue with some specks of white	Pale blue with white area
A valve opening	—	Click present in any cycle	Not present
A valve closing	—	Click present in any cycle	Not present
E or A wave	—	Present in any cycle	Not present
Baseline	—	Trace returns to baseline in any diastole	Trace does not return to baseline

A15

COMPARISON OF NORMAL RANGES OF CARDIOVASCULAR INDICES FOR CHINESE AND AUSTRALIAN CHILDREN DERIVED USING THE ULTRASOUND CARDIAC OUTPUT MONITOR (USCOM)

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Objectives: (1) To derive normal ranges for heart rate (HR), cardiac output (CO), stroke volume (SV) and systemic vascular resistance (SVR) in Chinese children in Hong Kong using the Ultrasound Cardiac Output Monitor (USCOM). (2) To compare these ranges with those provided by the makers of the USCOM for Australian children.

Materials and methods: 948 Chinese children (430 girls, 518 boys), aged 0-11.9 years old (mean 6.9, SD 2.6), in kindergartens and primary schools in Hong Kong. Blood pressure was measured using standard oscillometry. Height to 0.1 cm and weight to 0.2 kg were measured. Cardiovascular indices were measured using the USCOM. Normal ranges were derived for each parameter, defined as lying within 2 standard deviations of the mean. One-sample t-test was used for comparison with the mean values of cardiovascular indices in Australian children.

Results: The derived normal ranges (means) for cardiovascular indices in Chinese children are presented (see table below). The ranges of HR, CO, SV and SVR in Chinese children were significantly different from those derived in Australia.

Conclusions: This is the only study to derive normal values of USCOM cardiovascular indices for Chinese children. We hope that the use of these values, specific for Chinese children, will improve the diagnosis, treatment, management and monitoring of paediatric patients in Chinese emergency departments.

Age	n	HR (/min)	CO (L/min)	SV (mL)	SVR (d.s.cm ⁵)
0	3	56-115 (85)	1.5-2.6 (2.1)	9.1-20.4 (14.7)	1631-3309 (2470)
1	6	114-167 (141)	2.0-3.1 (2.6)	15.6-28.4 (22.0)	1558-2362 (1960)
2	21	91-143 (117)	2.0-4.2 (3.1)	17.9-44.1 (31.0)	1101-2634 (1867)
3	59	74-129 (101)	2.3-4.7 (3.5)	25.7-45.3 (35.5)	1016-2265 (1641)
4	108	74-123 (99)	2.3-5.4 (3.8)	27.1-54.8 (41.0)	799-2234 (1517)
5	104	66-123 (95)	2.4-5.5 (3.9)	30.2-60.4 (45.3)	857-2055 (1456)
6	117	66-109 (88)	2.6-5.8 (4.2)	33.8-65.3 (49.5)	854-2039 (1447)
7	124	62-108 (85)	2.6-6.3 (4.5)	32.8-75.7 (54.3)	869-1933 (1401)
8	117	56-110 (83)	2.9-6.8 (4.8)	38.6-79.2 (58.9)	851-1812 (1332)

9	99	58-107 (83)	2.7-7.6 (5.2)	42.1-84.6 (63.3)	742-1758 (1250)
10	85	57-107 (82)	3.0-7.8 (5.4)	43.6-99.0 (71.3)	698-1721 (1210)
11	105	52-101 (77)	3.3-8.2 (5.7)	49.3-100.8 (75.0)	650-1659 (1155)

A16

A RANDOMIZED CONTROLLED AND CROSSOVER TRIAL COMPARING CONVENTIONAL VALSALVA MANOEUVRE AND INSPIRATION BREATH HOLDING MANOEUVRE FOR PAROXYSMAL SUPRAVENTRICULAR TACHYCARDIA

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Background: The author presented a case series of novel Inspiration Breath Holding Manoeuvre (IBHM) for paroxysmal supraventricular tachycardia (PSVT) in SSEM 2007. To validate the new method, this study was carried out to compare with the conventional Valsalva manoeuvre (VM).

Method: All patients presenting to the accident and emergency (AE) department with PSVT were randomized by their last digit of AE number into 2 groups. Each group would try one of the two vagal manoeuvres (IBHM or VM). If unsuccessful, the other manoeuvre would be tried. If both manoeuvre failed, pharmacological treatment by adenosine triphosphate or calcium antagonist would be offered. The study obtained approval of our ethics committee.

Result: A total of 80 cases were recruited over a period of 14 months. Forty percent of the cases could not be analyzed as these cases did not follow the protocol strictly. The total successful rate of vagal manoeuvres was 15%. There was no difference in the successful rates between IBHM and VM.

Conclusion: This study did not prove IBHM a better manoeuvre than VM. However, the high dropout rate and suspected technical fallacy might make the results far from ideal.

A17

IN-FLIGHT MEDICAL EMERGENCIES IN HONG KONG COMMERCIAL AVIATION

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Background: With increasing globalization, commercial air travel has become more accessible. More passengers present with in-flight medical problems, and critical illness may lead to aircraft diversions or in-flight death. The study objective was to examine the predictors of medical diversions and in-flight deaths among passengers who present with in-flight medical problems.

Methods: Retrospective cohort study of in-flight medical problems for a large commercial airline based in Hong Kong.

All passengers with in-flight medical problems for whom emergency medical advice (MedLink) was sought from December 2003 to November 2008 were studied. For each passenger set variables were collected, and those with recorded outcomes of diversion and death were identified. The variables associated with diversion and death were identified using t-tests, chi square tests and logistic regression analysis.

Results: There were 4068 medical emergencies with 46 diversions and 30 deaths in the five year study period. Increasing age, altered mental status and the use of an automated external defibrillator (AED) were significant risk factors for both diversions and deaths. For passengers aged 81-90 years who presented with medical problems, the odds ratio for diversion increased to 15.2 compared to 11-20 year olds. Passengers who were unconscious were 33.4 times more likely to require diversion and 234 times more likely to die. 10.7% of passengers with obstetric or gynaecological conditions were diverted.

Conclusions: Public awareness of potential medical risks during flights and pre-screening of passengers are important in preventing in-flight medical emergencies. Improvements in the reporting system are necessary to improve our understanding of in-flight medical emergencies.

A18

MANAGEMENT OF SUSPECTED DEEP VENOUS THROMBOSIS IN THE EMERGENCY MEDICINE WARD IN HONG KONG

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Background: Clinical signs and symptoms vary for patients with deep venous thrombosis (DVT). DVT is an important diagnosis to recognize as it can lead to proximal embolism into the pulmonary circulation resulting in sudden collapse and death. This study presents the results of the management of suspected DVT patients in the emergency medicine ward (EMW) setting in Hong Kong.

Methods: Retrospective review of patients with suspected DVT admitted to the EMW from April to December 2008 under a standardized protocol in a university hospital in Hong Kong. The use of clinical prediction rule and diagnostic tests including the modified Wells' score, D-dimer and ultrasound examination and the outcomes including the length of stay and secondary admission rate were discussed.

Results: There were a total of 100 patients with suspected DVT admitted to the EMW in the nine-month study period. Thirty percent were confirmed to have DVT using ultrasonography. Sixty-five percent of patients belonged to high-risk category for the modified Wells' score. Seventy-eight percent of patients had positive D-dimer results. Ten percent of patients were safely discharged without an ultrasound examination. The mean length of stay in the EMW was 2 days. Thirteen percent of the patients required secondary admission into other specialties.

Conclusions: EMW can shorten the hospital length of stay of patients with suspected DVT. The shortened length of stay was mainly the result of careful selection of patients for ultrasound examinations, arranging early ultrasound scans, and early discharge of these patients with appropriate follow up. Further improvements were identified including the management of these cases during the weekends and public holidays when diagnostic tests like D-dimer and ultrasound examination were not available.

A19

AN AUDIT ON THE LENGTH OF STAY AND OUTCOMES OF MAJOR TRAUMA PATIENTS RESUSCITATED IN A DISTRICT ACCIDENT AND EMERGENCY DEPARTMENT BEFORE TRANSFERAL TO A TRAUMA CENTRE

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Objectives: Under the existing trauma diversion system in Hong Kong, some severe trauma victims would still be sent to the nearest accident and emergency department (AED) instead of designated trauma centre for primary stabilization. We found that prolonged stay in a district AED (Pok Oi Hospital) occurred in some cases and had led to deterioration of physiological state on arrival to the trauma centre (Tuen Mun Hospital) as reflected by a substantial deterioration in revised trauma score (RTS). We report a complete clinical audit aimed at shortening the length of stay (LOS) and improving the outcomes of severe trauma patients in a district AED before transferral to the trauma centre.

Methods: A complete clinical audit based on the November 2007 to March 2009 trauma registry data. Specific problems were identified by specialists that might have contributed to the delay in the first audit. An intervention program was commenced in July 2008 with specific improvements to facilitate transfer and to reduce unnecessary district AED stay implemented. The time pledge of <40 minutes AED stay was selected. A digital countdown clock was installed to remind the resuscitation team on time. In the second audit, we conducted a detailed review on all relevant cases to ensure appropriate management had been provided without compromise. Two time periods (before [November 2007 to June 2008] and after [October 2008 to March 2009] the intervention) were selected for comparison with washout period of July to September 2008. The first outcome measured was the change in percentage of cases meeting the time pledge. The other outcomes measured were the change in percentage of cases with a deterioration of RTS on arrival to the trauma centre and the change in AED LOS.

Results: A total of 45 severe trauma cases were identified from the trauma registry. Eleven cases occurring during the washout period were excluded. In the pre-intervention period, 17.6% (3/17) met the time pledge and 17.6% (3/17) had deteriorations in RTS. For the post-intervention

period, 52.9% (9/17) met the time pledge and 11.8% (2/17) had deteriorations in RTS. The median LOS pre-intervention was 87.0 min and it significantly shortened to 38.0 min in the post-intervention period ($p=0.013$, Mann-Whitney U Test).

Conclusion: An intervention program with a pre-set time pledge can shorten the LOS of severe trauma patients in district AED before transferral to the trauma centre and reduce cases with deteriorations in RTS on arrival at the trauma centre.

A20

EVALUATION ON THE ADEQUACY OF MANAGEMENT PLAN DOCUMENTATION FOR INTER-FACILITY TRANSPORT OF PATIENTS WITH FEBRILE CONVULSION

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Introduction: Inter-facility transport (IFT) of patients is a frequent activity in the accident and emergency department (AED) of Pok Oi Hospital (POH). According to our IFT registry from September 2007 to June 2009, a total of 982 patients required nurse-led or doctor-led IFT. Febrile convulsion was the most common condition (14% of all nurse-led IFT cases) requiring nurse-led IFT in our department. Owing to the limitation that nursing staff have no right to prescribe medication independently, a well written management plan from emergency physicians would be essential to guide the prompt management of patients if en route complications arise.

Aim of the study: This study aimed at measuring and improving the quality of management plan documentation during nurse-led IFT for febrile convulsion patients.

Definition of standard, implementation measure and method of data collection: An adequate management plan should include (1) the type of monitoring, (2) the frequency of monitoring and (3) the action plan for management of first and subsequent convulsion during IFT. A more user-friendly IFT form and early case review with the doctor about the documentation of management plan was implemented after phase I of the study. Eighty percent compliance to the standard is considered as successful implementation. All the IFT forms were reviewed by emergency medicine specialists of the Inter-facility and Critical Care Medicine team of POH.

Results: A total of 138 cases were recruited. Forty-nine patients were included in the phase I (19/09/2007 to 31/03/2008) and 89 cases in phase II (07/04/2008 to 30/06/2009) of the study. The proportion of nurse-led IFT with clear documentation of the type and frequency of monitoring was 51% and 43% respectively in phase I. We achieved 100% compliance to these standards in Phase II. Regarding the action plan, the compliance increased from 12% to 51%. There was one case of convulsion in ambulance during IFT in phase I of the study period. With the provision of an adequate management plan, the patient was well managed

during the IFT and was discharged without complication.

Conclusions and recommendations: A more user friendly IFT form together with early case review can enhance the adequacy of management plan documentation for IFT. The implementation was considered not successful as only 51% had reached the standard. Further quality improvement initiatives may be required to enhance the adequacy of the written action plan e.g. development of clinical practice guideline for febrile convulsion in the emergency department.

A21

GERIATRIC CONSULTATION SERVICE IN EMERGENCY MEDICINE WARD: AN IMPACT ON ACUTE MEDICAL ADMISSION

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Introduction: Hong Kong is having a significant prevalence of geriatric patients who usually require admission after presentation to the health care system through emergency departments. Therefore, the Department of Medicine and Geriatrics of Tai Po Hospital (TPH) and the Accident and Emergency Department of Alice Ho Miu Ling Nethersole Hospital (AHNH) started "Program We Care" that aims at improving the geriatric consultation service.

Objectives: This study aimed at evaluating the acute medical admission rate of each triage category cases in the geriatric consultation "Program We Care" after the opening of the AHNH Emergency Medicine Ward (EMW) in the first half year of 2009.

Methods: Geriatric consultation service was provided at the AHNH EMW since mid-December 2008. Every weekday morning, eligible older patients were referred to the Geriatric Consultation Team (GCT). The study started from 1-1-2009 till 30-6-2009. Demographic information, diseases case mix, venue of discharge, and number of community nursing service (CNS) referrals were recorded. The admission rates of each triage category in the EMW were also demonstrated and compared with corresponding admission rates of each triage category in 2008 by non-parametric test.

Results: 323 geriatric consultations were requested with none belonged to triage category 1 and only 2 cases belonged to category 5. The age distribution ranged from 52 to 99 with a median of 77. The clinical categorization were summarized into: (1) Chronic pulmonary disease ($n=122$; 37.77%), (2) Debilitating cardiac disease ($n=64$; 19.81%), (3) Geriatric syndromes ($n=28$; 8.67%), (4) Neurological problems ($n=33$; 10.22%), (5) Diabetes-related problems ($n=20$; 6.19%), (6) Terminal malignancy ($n=12$; 3.72%) and (7) Others ($n=44$; 13.62%). One hundred and twenty-two (37.77%) patients were discharged home after GCT assessment and 80 (24.77%) discharged with CNS support. Admission to convalescence hospital (TPH) was suggested in 144 patients (44.58%) whereas 57 patients (17.65%) required placement in acute medical ward. The number of referrals, number of acute medical admission,

acute medical admission rate and general admission rate in AHNH in 2008 were illustrated: (1) Triage category 2 (n=9 [0]; 0.00%; 67.72%), (2) Triage category 3 (n=242 [47]; 19.42%; 52.88%), (3) Triage category 4 (n=70 [9]; 12.86%; 6.86%) and (4) Triage category 5 (n=2 [0]; 0.00%; 1.00%). **Conclusion:** EMW provides a good platform for the running of "Program We Care" geriatric consultation service, which provides comprehensive geriatric assessment in suitable geriatric patients, and hence effectively reduces the geriatric acute hospital admission rate.

A22

OUTCOME EVALUATION ON THE USE OF NURSE-LED TRANSPORT KIT (NLTK) IN INTER-FACILITY TRANSPORT

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Introduction: Transport kit is one of the key elements to ensure patient safety during inter-facility transport (IFT) and is generally reported to be heavy and inconvenient in accessing the required items by transport personnel.

Objective of the study: This study aimed at evaluating the safety outcome and the feedbacks from emergency nurses on using a new and lighter NLTK in IFT.

Methods: This was a prospective study from 1st January 2008 to 31st March 2008 carried out in the emergency departments in Pok Oi Hospital and Alice Ho Miu Ling Nethersole Hospital. All nurse-led IFT were included into the study and questionnaires were distributed to the staff in evaluating the satisfaction of the NLTK. Ratings before and after the use of NLTK were compared by non-parametric test.

Results: A total of 84 cases were transported with the use of the new NLTK in the period. The overall satisfaction rating before and after the use of the NLTK were 14.6 ± 3.0 and 19 ± 3.2 respectively (mean \pm SD) with significant improvement in terms of its adequacy of pharmacological agents, weight, convenience of item accessing and spaciousness of the kit ($p < 0.05$).

Conclusion: The new NLTK is better than the traditional transport kit, with regards to its superiority on weight, convenience and spaciousness with safety of nurse-led IFT preserved.

A23

AN OUTPATIENT PARENTERAL ANTIMICROBIAL THERAPY: AN ALTERNATIVE PLAN TO MANAGE FEMALE ACUTE PYELONEPHRITIS IN THE EMERGENCY MEDICINE WARD

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Objectives: In Hong Kong, patients with acute pyelonephritis (AP) conventionally were treated with

intravenous (IV) antibiotics (usually cefuroxime sodium) for days or until fever subsided as in-patients and followed by a switch to appropriate oral antibiotics (usually levofloxacin). Being a long acting third-generation cephalosporin, ceftriaxone was used as parental agent to treat AP on an outpatient basis. We reported the outcome of an alternative treatment plan (outpatient parenteral antimicrobial therapy [OPAT]) by early discharge of patients from the Emergency Medicine Ward (EMW) before fever subsided and daily outpatient follow-up with IV ceftriaxone 2 gm treatment.

Methods and patients: From 05/2007 to 03/2009, 9 cases of female AP patients were treated by OPAT. A total of 18 female AP cases admitted to the EMW within the same period were identified as age-matched control and treated by the conventional plan. Duration of fever, complication, and clinical cure rate of the 2 groups were compared.

Results: The mean length of in-patient stay of the OPAT group was 23.1 hours which was significantly lower than the mean length of in-patient stay of the control group (56.1 hours) ($p < 0.000$, Mann Whitney U Test). The mean durations of fever of the OPAT group and the control group were 2.33 days and 2.22 days respectively. ($p = 0.418$, Mann Whitney U Test). There was no major complication reported from both groups. Only one patient from the OPAT group was readmitted to the EMW again because of high fever. IV ceftriaxone was continued for 2 more days in the EMW with oral switch to levofloxacin subsequently. All patients' mid-stream urine samples were sent for culture and sensitivity test. Twenty-two samples revealed positive bacterial growth. *E. coli* (21/22) was the bacterial isolate except one isolate which was Klebsiella species. Three isolates of *E. coli* (3/21) were found to be extended-spectrum beta-lactamase (ESBL) producer positive. Two of them were from the control group and they were resistant to levofloxacin. The 2 ESBL positive patients were afebrile and stable on follow-up assessment. They were given a course of nitrofurantoin. One ESBL producer was from the OPAT group and the isolate was susceptible to levofloxacin. Otherwise all *E. coli* isolates were susceptible to ceftriaxone, cefuroxime sodium and levofloxacin. Notably, only 9 out of 18 non-ESBL *E. coli* isolates were fully susceptible to cefuroxime axetil.

Conclusions: Outpatient ceftriaxone daily for acute female pyelonephritis appears to be safe, effective and comparable to conventional in-patient treatment in the EMW by cefuroxime sodium. OPAT is an effective alternative treatment plan.

A24

INTRODUCTION OF A MODIFIED STROKE SCREENING TOOL AT THE EMERGENCY DEPARTMENT

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Introduction: Acute stroke is the second leading cause of all

deaths worldwide including Hong Kong. Sudden unilateral limb weakness, facial droop and speech disturbance were better recognized than other warning symptoms of stroke. Earlier notification allows rapid mobilization of stroke teams and early access to a CT scanner after hospital arrival.

Objectives: (1) Evaluate Los Angeles Prehospital Stroke Screen (LAPSS); (2) Introduce a modified stroke screening tool at triage (3-Ds model).

Methods: Prospective observational study. Adult patients who complained of stroke-like symptoms attending the emergency department were evaluated by LAPSS at triage. We divided the entire cohort into two groups, an evaluation group of 331 patients and a validation group of 440 patients collected between 1st January 2005 and 13th September 2007. The final diagnosis of true stroke was confirmed by radiological imaging results. Logistic regression model was used to evaluate the relative importance of each parameter in LAPSS to early identification of stroke patients.

Results: Patients presenting with unilateral limb weakness [Disability], blood glucose level (3.3-22 mmol/L) [Dextrose] and duration of symptom onset [Duration] can predict who are at risk of stroke. The odds ratio, 95%CI, p-value of the above variables were [2.043, 1.11-3.74, p=0.021], [1.102, 1.00-1.21, p=0.040] and [1.01, 1.08-1.31, p=0.041] respectively. Refer to the table for the performance of LAPSS and "3-Ds" model to predict true stroke.

Conclusion: Both screening methods are similar in identifying acute stroke patients with a high degree of accuracy but "3-Ds" may shorten the triage time. In a prospective, in-the-field trial, an easy to use scoring model has the potential to lead to earlier stroke treatment and better patient outcome.

Table - Performance of LAPSS and "3-Ds model" to predict true stroke

LAPSS (Evaluation)				3-Ds model (Validation)			
TP	FP	PPV	OR	TP	FP	PPV	OR
210	43	83	2.042	253	107	70.3	1.748
FN	TN	NPV	RR	FN	TN	NPV	RR
55	23	29.5	1.216	46	34	42.5	1.115
Sensitivity	Specificity	p-value		Sensitivity	Specificity	p-value	
79.2	34.8	0.016		84.6	24.1	0.027	

TP indicates true positive; FP, false positive; FN, false negative; TN, true negative; PPV, positive predictive value; and NPV, negative predictive value.

A25

ORAL PARACETAMOL AND/OR IBUPROFEN FOR TREATING PAIN AFTER SOFT TISSUE LIMB INJURIES: SINGLE CENTRE DOUBLE-BLIND, RANDOMISED CONTROLLED CLINICAL TRIAL

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Background: Non-steroidal anti-inflammatory drugs and paracetamol are commonly used oral analgesics in emergency departments (ED). Little is known about the relative efficacy of paracetamol and ibuprofen in the ED.

Objectives: To compare the analgesic efficacy of oral paracetamol, ibuprofen and their combination, and to establish and compare the safety of these three regimes.

Methods and setting: Single centre double-blind, randomised controlled clinical trial. ED patients with clinically evident soft tissue injuries to the limbs or mechanical back pain attending a university teaching hospital in Hong Kong with annual ED census of >140,000 patients.

Ethics and power calculation: Ethical approval was obtained from the local clinical research ethics committee. Seven hundred eighty-three patients were required to demonstrate differences in adverse events between the regimes.

Randomisation: Patients were randomised to one of three groups:

Group 1. Paracetamol 1 g x 4 and placebo ibuprofen 400 mg x 3 daily

Group 2. Ibuprofen 400 mg x 3 and placebo paracetamol 1 g x 4 daily

Group 3. Paracetamol 1 g x 4 and ibuprofen 400 mg x 3 daily

Outcomes:

1. Analgesic efficacy both at rest and activity

2. Presence, frequency and duration of adverse effects (up to 28 days)

Results: From 1332 potential participants, 783 patients (505, 64.5% male) were randomised. Seven hundred and five (90.0%) completed the ED phase, 669 (85.4%) completed initial follow up and 583 (74.5%) patients completed the study. There were no clinically significant differences in pain scores (at rest or activity) at any point between the groups. Adverse events at 28 days: Group 1 had 16/262 (6.1%) adverse events (rash, epigastric pain, indigestion), Group 2 had 26/258 (10.1%) and Group 3 had 32/263 (12.2%). There was a significant difference in adverse events between Groups 1 and 3 (p=0.016, χ^2 test) and a trend favouring Group 1 compared to Group 2 (p=0.097, χ^2 test).

Conclusion: Paracetamol is equally effective and has less adverse events than ibuprofen in the ED.