

ables potentially associated with skin flora were collected from the patients and their medical records.

Procedures

Only patients who gave informed consent were included in the study. The skin at the forearm and the sternum were the culture sites for each patient. If the sternum was unavailable because of a surgical wound or skin lesion, for example, the skin at the upper portion of the back was cultured. The culture plate used was a contact plate (Rodac plate containing trypticase soy agar with 5% sheep blood, Becton Dickinson, Cockeysville, Md). All samples were obtained by 1 of 3 infection control nurses who were trained in a standardized technique. The plate was gently rolled a single time over the medial surface of the forearm and another plate was done at midsternum for each patient. The plates were sent to the microbiology laboratory within 1 hour. The plates were incubated at 35°C for 24 hours. The colony count was made visually under a magnifying glass. The organisms grown on the plates were identified by standard techniques.

Data analysis

The clinical information and microbiologic data were entered into Statistical Package for the Social Science program, and the data were analyzed by descriptive statistics, parametric *t* tests, nonparametric tests, and multivariate analysis where appropriate. All statistical tests were 2-sided and considered significant at $P < .05$.

RESULTS

A total of 850 patients were asked to participate in the study and all voluntarily agreed. The characteristics of the 350 outpatients and 500 inpatients are shown in Table 1. The prevalence of underlying diseases of cancer and valvular heart disease was significantly higher in patients who were hospitalized; whereas HIV/AIDS, stroke, and chronic renal failure were significantly more prevalent in outpatients. Antibiotic and corticosteroid therapy, and operation were more prevalent for inpatients. Only 2 patients had a culture taken from the skin of their upper back instead of their sternum. The colony-forming units (CFUs) of the organisms cultured from the skin of the patients are shown in Table 2. There is a significant correlation of CFUs between forearm and sternum for inpatients ($r = 0.6$; $P < .001$) and outpatients ($r = 0.5$; $P < .001$). The number of micro-organisms on the sternum was

Table 1. Characteristics of 350 outpatients and 500 inpatients

Characteristic	Outpatients (350)	Inpatients (500)	Total (850)
Sex			
Male	157 (44.9%)	276 (55.2%)	433 (50.9%)
Female	193 (55.1%)	224 (44.8%)	417 (49.1%)
Age, y			
Mean (SD)	50.8 (15.8)	56.4 (17.2)	54.1 (16.9)
Range	21-86	20-94	20-94
Height, cm			
Mean (SD)	158.8 (8.3)	161.1 (8.4)	160.2 (8.4)
Body weight, kg			
Mean (SD)	58.4 (10.8)	58.2 (12.3)	58.3 (11.7)
Ethnicity			
Thai	343 (98%)	476 (95.2)	819 (96.4%)
Chinese/other	7 (2%)	24 (4.8%)	31 (3.6%)
Service			
General medical wards	99 (28.3%)		
Surgical clinics	76 (21.7%)		
Special clinics	175 (50%)		
General surgical wards		125 (25%)	
Medical ICU		125 (25%)	
Surgical ICU		125 (25%)	
Underlying diseases			
Absent	131 (37.4%)	218 (43.6%)	349 (41.1%)
Present	219 (62.6%)	282 (56.4%)	501 (58.9%)
Underlying disease types			
Diabetes mellitus	53 (15.1%)	64 (13.2%)	119 (14.0%)
Cancer*	46 (13.1%)	110 (22.0%)	156 (18.4%)
Ischemic heart	33 (9.4%)	66 (13.2%)	99 (11.6%)
Valvular heart*	13 (3.7%)	41 (8.2%)	54 (6.4%)
Chronic obstructive pulmonary	10 (2.9%)	25 (5.0%)	35 (4.1%)
Cirrhosis	11 (3.1%)	7 (1.4%)	18 (2.1%)
HIV/AIDS*	10 (2.9%)	2 (0.4%)	12 (1.4%)
Stroke*	10 (2.9%)	4 (0.8%)	14 (1.6%)
Chronic renal failure*	16 (4.6%)	8 (1.6%)	24 (2.8%)
Autoimmune	7 (2.0%)	5 (1.0%)	12 (1.4%)
Medications and procedures			
Antibiotics*	24 (6.9%)	383 (76.6%)	407 (47.9%)
Antineoplastics	22 (6.3%)	11 (2.2%)	33 (3.9%)
Corticosteroid*	14 (4.0%)	77 (15.4%)	91 (10.7%)
Operation*	2 (0.6%)	193 (38.6%)	195 (22.9%)

ICU, Intensive care department.

* $P < .05$ between outpatients and inpatients.

significantly higher than that on the forearm for both outpatients and inpatients. The number of organisms on the forearm and sternum of inpatients was significantly higher than that of outpatients. Univariate analysis revealed that older age, higher body weight, hospitalization, ischemic heart disease, diabetes mellitus, autoimmune disease, chronic obstructive pulmonary disease, undergoing operation, and receiving antibiotics was significantly associated with high counts (CFUs > 600). The factors associated with high

Table 2. Colony counts of organisms cultured from skin of patients

	Site	Colony count				
		Mean	Median	Range	>200	>600
350 Outpatients	Forearm	180	123	3-1797	28.6%	3.4%
	Sternum	275	199	6-2008	49.7%	9.7%
500 Inpatients	Forearm	281	161	0-1600	43%	13.4%
	Sternum	351	231	0-1500	53.8%	20.4%
Total 850	Forearm	239	140	0-1797	37.1%	9.3%
	Sternum	320	217	0-2008	52.1%	16%

Table 3. Factors associated with high counts (CFU > 600) from multivariate analysis

Factor	Odds ratio	95% Confidence Interval
Hospitalization	2.4	1.6-3.9
Chronic pulmonary disease	3.4	1.7-7.5
Diabetes mellitus	1.9	1.2-3.2
Autoimmune disease	4.3	1.3-14.5
Operation	1.7	1.1-2.5
Antibiotic	2.3	1.6-3.3

counts from multivariate analysis are shown in Table 3. High counts were found more often in patients who were hospitalized; those with chronic obstructive pulmonary disease, diabetes mellitus, and autoimmune diseases; those having undergone operation; and those receiving antibiotics. The types of organisms recovered from forearm and sternum of outpatients and inpatients are shown in Table 4. *Acinetobacter* spp were found in 335 (39.4%) of 850 patients. They were found in 239 (47.8%) of 500 inpatients and 96 (27.4%) of 350 outpatients. The prevalence of *Acinetobacter* spp colonized on the skin of inpatients was significantly higher than that of outpatients ($P < .001$). Of *Acinetobacter* spp, 62% were *A. baumannii* and the rest were *A. lwoffii*. Methicillin-resistant *Staphylococcus aureus* was found significantly more often in patients who were hospitalized, whereas micrococci was found more often in outpatients. Univariate analysis revealed that hospitalization, chronic obstructive pulmonary disease, autoimmune disease, having operation, or receiving antibiotics or corticosteroid was significantly associated with *Acinetobacter* spp skin colonization. The factors associated with *Acinetobacter* spp skin colonization from multivariate analysis are shown in Table 5. The factors associated with *Acinetobacter* spp skin colonization were hospital-

ization, having chronic obstructive pulmonary or autoimmune disease, and receiving antibiotics.

DISCUSSION

The differences in several characteristics of the patients observed in the study, such as underlying diseases, may not be clinically meaningful because we used quota sampling in which some specialty clinics (eg, oncology, HIV/AIDS, renal, cardiology, and neurology) were purposely chosen to cover a variety of diseases. Comparing our results for patients in Thailand with the study of patients in the United States by Larson et al.¹⁰ which used the identical methodology, revealed the following similar findings: (1) mean CFUs on sternum were more than on forearm and (2) methicillin-resistant *S. aureus* was found significantly more often for inpatients, whereas micrococci was found more often in outpatients. The main differences between our study and that by Larson¹⁰ were (1) the mean CFUs of the organisms in patients in Thailand were higher than those of patients in the United States; (2) high count (CFU > 600) rate was higher for patients in the United States; (3) gram-negative bacilli were found more often in outpatients in the United States, whereas they were found more often in patients who were hospitalized in Thailand; (4) age, black race, diabetes, and medical intensive care department admission were found to be correlated with high counts in the United States, whereas the factors associated with high counts in Thailand were patients who were hospitalized, had chronic obstructive pulmonary disease, had diabetes mellitus, had autoimmune diseases, had undergone operation, and were receiving antibiotics; and (5) *Acinetobacter* spp. was observed in 12.3% of patients in the United States, whereas it was found in 17% of outpatients and 35% of inpatients in Thailand. The observation of high prevalence of *Acinetobacter* spp skin colonizers in patients in Thailand is worth exploring. *Acinetobacter* spp has been the common

Table 4. Types of organisms cultured from forearm and sternum of outpatients and inpatients

Organism	359 Outpatients		500 Inpatients	
	Forearm	Sternum	Forearm	Sternum
Gram-positive bacteria				
Coagulase negative Staphylococci	338 (96.6%)	340 (97.1%)	483 (96.6%)	484 (96.8%)
<i>Staphylococcus aureus</i>				
MSSA	22 (6.3%)	17 (4.9%)	19 (3.8%)	17 (3.4%)
MRSA*	1 (0.3%)	1 (0.3%)	13 (2.6%)	16 (3.2%)
Enterococci (VRE)	1 (0.3%)	—	5 (1%)	3 (0.6%)
Micrococc*	123 (35.1%)	118 (33.7%)	70 (14%)	82 (16.4%)
Diphtheroides	36 (10.3%)	55 (15.7%)	68 (13.6%)	72 (14.4%)
<i>Bacillus</i> spp	102 (29.1%)	114 (32.6%)	143 (28.6%)	133 (26.6%)
<i>Streptococcus viridans</i>	21 (6%)	10 (2.9%)	2 (0.4%)	3 (0.6%)
Other gram positives	332 (94.9%)	335 (95.7%)	463 (92.6%)	453 (90.6%)
Gram-negative Bacteria				
<i>Klebsiella</i> spp	5 (1.4%)	5 (1.4%)	10 (2%)	10 (2%)
<i>Acinetobacter</i> spp*	58 (16.6%)	60 (17.1%)	177 (35.4%)	178 (35.6%)
Nonfermentative GNR	18 (5.1%)	23 (6.6%)	20 (4%)	17 (3.4%)
<i>Pseudomonas aeruginosa</i>	3 (0.9%)	2 (0.6%)	5 (1%)	6 (1.2%)
<i>Proteus</i> spp	5 (1.4%)	2 (0.6%)	—	1 (0.2%)
<i>Enterobacter</i> spp	1 (2.8%)	2 (0.6%)	5 (1%)	—
Fungus				
Yeast	1 (0.3%)	1 (0.3%)	1 (0.2%)	1 (0.2%)

MSSA, methicillin-sensitive *Staphylococcus aureus*; MRSA, methicillin-resistant *Staphylococcus aureus*; VRE, vancomycin-resistant Enterococci; GNR, gram-negative rods.

*P < .05 between outpatients and inpatients.

causative bacteria for hospital-acquired infections in Thailand and Hong Kong.¹⁵⁻¹⁷ At Siriraj Hospital, *A baumannii* was isolated from blood culture in 86 patients in 1998 and 81 patients in 1999. It was isolated from sputum in 479 patients in 1998 and 461 patients in 1999. *Acinetobacter* spp could be cultured from the skin of healthy people, especially men, during the warmer months of the year and this could be a result of greater perspiration production in males particularly in hot weather that leads to greater colonization of the skin.^{9,18} *Acinetobacter* spp were also found on the skin of health care personnel and inpatients, which might lead to nosocomial infections.^{3,7-9,14,19-21} These observations indicate that human skin is frequently colonized by *Acinetobacter* spp. However, most *Acinetobacter* spp colonized on the skin reported in the literature is not *A baumannii*. Because *A baumannii* is the main species of *Acinetobacter* causing nosocomial infections, the natural reservoir of *A baumannii* remains to be identified. More interestingly, most of *Acinetobacter* spp colonized on the skin of patients in Thailand was *A baumannii*, which was the species responsible for hospital-acquired infections worldwide including Thailand. Therefore, our study demonstrated that *Acinetobacter* spp colonized on the skin of the patients is *A baumannii*, which corresponded to the species causing bacteremia and pneumonia in the same hospital.

Table 5. Factors associated with *Acinetobacter* spp. skin colonization from multivariate analysis

Factor	Odds ratio	95% Confidence Interval
Hospitalization	1.5	1.1-2.3
Chronic pulmonary disease	2.5	1.2-5.1
Autoimmune disease	4	1.1-13.8
Antibiotics	2	1.3-2.9

Unfortunately *A baumannii* isolated from the skin and from the clinical specimens of the patients during the study period was not collected for further study. Therefore, we cannot be certain that they are the same strains. However, the study of *Acinetobacter* infections in Siriraj Hospital has been conducted since January 2002 and all strains of causative agents will be collected. Moreover, *Acinetobacter* spp isolated from environments or the skin of some patients will be collected and compared with clinical strains.

The authors would like to thank JIM Co Ltd for supplying the Rodac plates.

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Effect of Bupivacaine With Epinephrine Wound Instillation for Pain Relief After Pediatric Inguinal Herniorrhaphy and Hydrocelectomy

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Background and Objectives: To evaluate the effect of a 20- or 60-second instillation period using 0.5% bupivacaine with epinephrine for pain relief after pediatric inguinal herniorrhaphy and hydrocelectomy.

Methods: In a randomized, double-blind study, 103 children (aged 1 to 12 years, American Society of Anesthesiologists [ASA] physical status I or II) were allocated into 4 groups after induction of anesthesia. Group 1: normal saline 0.25 mL/kg instilled, which remained in the wound for 20 or 60 seconds before wound closure. Group 2: 0.25 mL/kg 0.5% bupivacaine with epinephrine 5 µg/mL, instilled, which remained in the wound for 20 seconds. Group 3: the same quantity and dose of drug 2 instilled as group, but remained in the wound for 60 seconds. Group 4: an ilioinguinal and iliohypogastric block performed before operation using 0.5 mL/kg 0.25% bupivacaine with epinephrine. The Children's Hospital of Eastern Ontario Pain Scale (CHEOPS) and Aldrete-Kroulik recovery scores were used to monitor postoperative pain and recovery status. Analgesic was given when the CHEOPS score was ≥ 7 despite other supportive therapy.

Results: The number of patients requiring analgesics within 2 hours in group 1 (73.1%) was more than groups 2, 3, and 4 (23.1%, 20.8%, and 16%, respectively, $P < .001$). The median time to first analgesic in group 1 (50 minutes) was also less than groups 2, 3, and 4 (420, 525, and 425 minutes, respectively, $P < .0001$).

Conclusion: 0.5% Bupivacaine with epinephrine for as short an instillation period as 20 or 60 seconds can provide a good analgesic alternative after herniorrhaphy and hydrocelectomy in pediatric patients. All studied blocks had comparable duration of action. *Reg Anesth Pain Med* 2003;28:24-28.

Key Words: Bupivacaine, Epinephrine, Instillation, Herniorrhaphy, Hydrocelectomy.

Inguinal herniorrhaphy and hydrocelectomy are common ambulatory surgical procedures in pediatric patients. Various techniques of regional analgesia, such as caudal block, ilioinguinal and iliohypogastric (IG/IH) block, topical spray, and wound infiltration have been shown to provide effective postoperative analgesia without delaying discharge.¹⁻⁴ Instillation of 0.25% bupivacaine 0.25

mL/kg into the wound at the completion of surgery provides an analgesic effect comparable to IG/IH nerve block.⁴ This approach seems to be simple, but there is still a problem of compliance secondary to the 2-minute instillation time reportedly required for this technique. There has been no study investigating the effect of local anesthetic remaining for a shorter period (< 2 minutes). Theoretically, the therapeutic effects of local anesthetic depend on local disposition, which is influenced by bulk flow of the injected solution, diffusion, and binding of the agent.⁵ When a local anesthetic comes into contact with a peripheral nerve ending for a very short period, the analgesic effect may be insufficient to relieve pain. We hypothesized that if we increased the concentration of local anesthetic to increase the mass of drug and added epinephrine to reduce systemic absorption, we could accelerate the onset and quality of nerve block. Therefore, this study aimed to investigate the analgesic effect of

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Accepted for publication September 19, 2002.

Supported by Siriraj Research Development Fund and Thailand Research Fund.

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1098-7339/03/2801-0005\$35.00/0
doi:10.1053/rapm.2003.50010

instilling 0.5% bupivacaine with epinephrine 5 μ g/mL into the wound for only 20 to 60 seconds to determine its effectiveness as compared with placebo or IG/IH block.

Methods

The study was approved by the Institutional Ethics Committee, and written informed parental consent was obtained. Children aged 1 to 12 years with an American Society of Anesthesiologists (ASA) physical status of I or II, undergoing ambulatory inguinal herniorrhaphy or hydrocelectomy, were enrolled in this prospective randomized, controlled trial. The patients, anesthesiologists, and evaluators were blinded to the treatment received. None of the children received preanesthetic medication.

After applying standard monitors, anesthesia was induced with 70% nitrous oxide, 30% oxygen and sevoflurane, then maintained with 70% nitrous oxide, 30% oxygen and halothane via a face mask. The inspired concentration of halothane was adjusted to maintain the systolic blood pressure within 25% of the baseline value. No intraoperative opioids were administered. Before the operations commenced, patients were randomized into 1 of 4 groups by using a random number table. Group 1 was further randomized into a 20-second or 60-second exposure group (to blind surgeons and anesthesiologists). The number of patients who received normal saline 20 and 60 seconds roughly proximate treatment group number, and they were defined as 1 control group because of the similar treatment effect. Groups were also stratified by age (< 5 years and \geq 5 years) due to differences in ability to report pain and by type of surgery. Group 1 patients received an instillation of 0.25 mL/kg normal saline, which remained for either 20 or 60 seconds before wound closure. Group 2 patients received 0.25 mL/kg 0.5% bupivacaine with epinephrine 5 μ g/mL, which remained for 20 seconds before wound closure (BE20). Group 3 patients received 0.25 mL/kg 0.5% bupivacaine with epinephrine 5 μ g/mL, which remained for 60 seconds before wound closure (BE60). Group 4 patients received an ilioinguinal and iliohypogastric block (IG/IH block) with 0.5 mL/kg 0.25% bupivacaine with epinephrine 5 μ g/mL¹⁰ after induction of anesthesia.

The instillation block was performed by surgeons after ligation of the hernial sac. Bupivacaine or saline was instilled into the wound involving muscle and subcutaneous layers and allowed to remain for 20 or 60 seconds. The instilled fluid was swabbed before wound closure.

On arrival to the postanesthesia care unit (PACU), objective pain assessments were performed every 15 minutes by 1 of 2 research nurses blinded to the type of regional anesthetic technique employed, using CHBOPS (The Children's Hospital of Eastern Ontario Pain Scale).¹¹ The research nurses were trained how to rate 30 pain behaviors with CHBOPS using a videotape and were tested for inter-rater reliability until intraclass correlation (ICC) of 0.8 was achieved. Intravenous fentanyl 1 μ g/kg was given to any patient who achieved a pain score of \geq 7 points on 2 successive 5-minute observations¹² and failure of other supportive therapy (parental presence, relief of nausea, vomiting, thirst, or a full bladder). Patient recovery was assessed at 15-minute intervals and recorded using the Aldrete-Kroulik recovery scoring criteria.¹³ The time at which the recovery score reached 5 (recovery time) and the time at which all discharge criteria at our hospital were achieved (discharge time) were also recorded. Patients were kept in PACU for at least 2 hours or until the discharge criteria were fulfilled.

Parents were trained how to use CHBOPS rating of 10 pain behaviors from a videotape. Parent inter-rater reliability with research nurses was tested to determine their ability to rate their child's pain behaviors in the PACU. Further training for parents was required until an ICC of 0.8 was achieved.

If patients did not feel pain when discharge criteria were fulfilled, their parents provided pain assessment at home until the CHBOPS score was \geq 7 despite other supportive therapy. Oral paracetamol 10 mg/kg would then be given and the time recorded as the first analgesic needed. Home data were sent to the researcher by phone or letter.

The sample size was calculated based on the proportion of patients who required analgesics in the placebo group = 0.73,^{7,8} in the IG/IH group = 0.03⁶ to 0.45⁸ (average proportion = 0.24), and in the instillation group = 0.03⁶ to 0.53⁷ (average proportion = 0.29). With a 2-sided type I error of 5% and study power at 80%, the number of patients required in each group to demonstrate a difference between the placebo group and the IG/IH group, or placebo group and instillation groups, was 24.

The demographic data of the groups was analyzed using either analysis of variance for parametric quantitative data or Kruskal-Wallis test for non-parametric quantitative data and χ^2 test for categorical data. The proportion of patients who required analgesic within 2, 4, and 6 hours was compared between the groups using the χ^2 test.

Table 1. Demographic Data

	NSS (n = 26)	BE20 (n = 26)	BE60 (n = 24)	IG/IH (n = 25)	P Value
Age (yr): median (IQR)	4 (3-6)	3 (2-5.5)	3.5 (2-5.5)	3 (2.5-5)	.52*
Weight (kg): median (IQR)	16.8 (15-22.5)	15 (11.5-17.5)	15.5 (12-21.5)	14 (12-20)	.26*
Male gender n (%)	23 (86)	22 (85)	22 (92)	23 (92)	.81†
Type of operation					
Hemic n (%)	17 (65)	16 (62)	15 (63)	16 (64)	.892†
Hydrocoel n (%)	9 (35)	10 (38)	9 (37)	9 (36)	

Abbreviations: IQR, interquartile range; NSS, 0.25 mL/kg normal saline instillation and remaining 20 or 60 seconds; BE20, 0.25 mL/kg 0.5% bupivacaine with epinephrine 5 µg/mL instillation and remaining 20 seconds; BE60, 0.25 mL/kg 0.5% bupivacaine with epinephrine 5 µg/mL instillation and remaining 60 seconds; IG/IH, 0.5 mL/kg 0.25% bupivacaine for ilioinguinal and iliohypogastric nerve block.

*Kruskal-Wallis test.

† χ^2 test.

Because not all patients required analgesic within 12 hours, Kaplan-Meier survival curve and Log-rank tests were applied to compare time to first analgesic between the 4 groups. A *P* value of <.05 was considered statistically significant. Two pairwise comparisons were performed by using Bonferroni method to adjust type I error due to multiple testing.

Results

A total of 103 patients were included in the study. One patient in group 2 and 1 patient in group 3 were eliminated from the study because their parents gave paracetamol for another reason (i.e., severe headache rather than wound pain). The ICC of pain scores rated by parents and research nurses was 0.977, and parents rated the ease of using CHBOPS as 3.43 ± 1.75 (0 = easiest, 10 = most difficult).

The patients in the 4 groups were comparable with regards to age, weight, sex, and type of

surgery (Table 1). Duration of surgery, anesthesia, recovery time, discharge time, and proportion of patients who were discharged within 4 hours were not different among groups (Table 2). One patient from group 1 and 1 patient from group 2 stayed in the hospital overnight because of severe vomiting. The need for analgesics within 2, 4, and 6 hours, including maximum CHBOPS scores in PACU, in groups 2, 3, and 4 were less than the placebo group, but not different from each other (Table 3). The median time to first analgesic of the placebo group was less than the other 3 groups (Table 3). There was no difference in the median time to first analgesic between groups 2, 3, and 4 (*P* = .5595). Five patients (20%) in the IG/IH group and 1 (4%) patient from the instillation BE20 group had a limping gait from a temporary ipsilateral femoral nerve palsy due to local anesthetic block. Nausea and vomiting were reported in 4 cases (15.4%) in group 1, 3 cases (11.5%) in group 2, 5 cases (20.8%) in group 3, and 2 cases (8%) in group 4.

Table 2. Duration of Surgery, Anesthesia, Recovery Time, Time to Discharge, and Proportion of Patients Who Were Discharged Within 4 Hours

	NSS (n = 26)	BE20 (n = 26)	BE60 (n = 24)	IG/IH (n = 25)	P Value
Operation time (min)					
Median (IQR)	35 (27.3-40)	32.5 (25-40)	36 (30-45)	35 (26.5-40)	.720*
Anesthesia time (min)					
Median (IQR)	45 (43.5-60)	45 (40-55)	50 (45-60)	50 (42.5-55)	.826*
Recovery time (min)					
Median (IQR)	27.5 (15-35)	35 (20-50)	30 (21.3-45)	35 (17.5-62.5)	.173†
Time to discharge (min)					
Mean (95% CI)	195 (179-211)	200.1 (187.3-214.3)	182.9 (164.5-201.3)	196.2 (163.1-209.3)	.4451†
Patients discharged within 4 hr					
n (%)	18 (68.2)	18 (69.2)	21 (87.5)	20 (80)	.350‡

Abbreviations: IQR, interquartile range; NSS, 0.25 mL/kg normal saline instillation and remaining 20 or 60 seconds; BE20, 0.25 mL/kg 0.5% bupivacaine with epinephrine 5 µg/mL instillation and remaining 20 seconds; BE60, 0.25 mL/kg 0.5% bupivacaine with epinephrine 5 µg/mL instillation and remaining 60 seconds; IG/IH, 0.5 mL/kg 0.25% bupivacaine for ilioinguinal and iliohypogastric nerve block; CI, confidence interval.

*Kruskal-Wallis test.

†Log rank test.

‡ χ^2 test.

Table 3. Number of Patients Requiring Analgesic, Time to First Analgesic, and Maximum CHEOPS Score in PACU

	NSS (n = 26)	BE20 (n = 26)	BE60 (n = 24)	IG/IH (n = 25)	P Value
Patients requiring analgesics					
within 2 hr, n (%)	19 (73.1)	8 (31.1)	5 (20.8)	4 (16)	<.001*
within 4 hr, n (%)	19 (73.1)	9 (34.6)	8 (33.3)	6 (24)	.003*
within 6 hr, n (%)	21 (80.8)	11 (42.3)	11 (45.8)	9 (36)	.008*
Time to first analgesics (min)					
Median (95%CI)	50 (25.0-75.0)	420 (297.5-542.4)	525 (134.5-915.1)	425 (310.5-639.2)	<.0001†
Maximum CHEOPS scores in PACU					
Median (IQR)	11.5 (5.75-12)	5.5 (5-10)	6 (5-7.75)	5 (5-7.5)	.001‡

Abbreviations: IQR, interquartile range; CHEOPS, The Children's Hospital of Eastern Ontario Pain Scale; NSS, 0.25 mL/kg normal saline instillation and remaining 20 or 60 seconds; BE20, 0.25 mL/kg 0.5% bupivacaine with epinephrine 5 µg/mL instillation and remaining 20 seconds; BE60, 0.25 mL/kg 0.5% bupivacaine with epinephrine 5 µg/mL instillation and remaining 60 seconds; IG/IH, 0.5 mL/kg 0.25% bupivacaine for ilioinguinal and iliohypogastric nerve block; PACU, postanesthesia care unit.

* χ^2 test.

†Log rank test.

‡Kruskal-Wallis test.

Discussion

Instillation of 0.5% bupivacaine with epinephrine 5 µg/mL for only 20 or 60 seconds before wound closure provided postoperative analgesia in children undergoing herniorrhaphy and hydrocelectomy. The analgesic effect was equal to an ilioinguinal and iliohypogastric nerve block and clearly superior to the instillation of saline. The proportion of patients in the 20-second and 60-second instillation groups and the IG/IH group who required rescue analgesics within 2, 4, and 6 hours was one third to one half that required in the placebo group. The median time to first analgesic in the instillation groups and IG/IH group was about 8 to 10 times longer than the placebo group. The effectiveness of IG/IH was comparable to the instillation of bupivacaine and epinephrine.

The rate of rescue analgesic administration within 2, 4, and 6 hours in the placebo group was 73.1%, 73.1%, and 80.8%, respectively, which is similar to the results of previous studies (73%).^{7,8} The requirement for rescue analgesics in the IG/IH group within 2 hours (16%) was higher than reported by Casey et al.⁸ (3%). In addition, the proportion of patients in instillation groups who required analgesics within 2 hours (BE20 group, 23.1%; BE60 group, 20.8%) was also higher than in the study by Casey et al.⁸ (3%). These differences may be due to several reasons. Poor technique of IG/IH block in our study might have led to an incomplete block. We did not control the anesthesiologists who performed the block because we would like to apply the results to general anesthetic practice. Also, the longer time that local anesthetic solution remained in the muscle layer and in the subcutaneous layer in Casey's technique (2 minutes) might affect the quality of block. Moreover,

some children experiencing emergence delirium may have been misinterpreted as having pain and received rescue analgesia as a result.

To improve physician compliance with the instillation technique, this study demonstrated the feasibility of wound instillation involving muscle and subcutaneous layers for only 20 and 60 seconds. We provided effective analgesia by increasing the mass of bupivacaine from 0.25% solution to a 0.5% solution and adding epinephrine to reduce systemic absorption. Increasing the instillation time of the drug to 60 seconds before swabbing did not improve analgesia as compared with an instillation time of 20 seconds. It is unlikely that iliohypogastric and ilioinguinal nerves could be effectively blocked by the small amount of bupivacaine left surrounding them.

Ethical concerns regarding a placebo-controlled analgesic study were ameliorated by the ready availability of rescue analgesics to treat mild pain (CHEOPS ≥ 7). This format also allowed observations regarding the natural history of pain and analgesic requirements in children after herniorrhaphy and hydrocelectomy. About 20% of the children in the normal saline group did not require analgesics within 6 hours after surgery.

An ilioinguinal and iliohypogastric block is effective, but requires special training. This procedure may also cause unsatisfactory wound edema. An ipsilateral femoral nerve palsy was found in the IG/IH group more frequently because a larger volume of local anesthetic was injected into the plane between the transversus abdominis muscle and the transversalis fascia with this technique. This plane connects laterally with the tissue plane deep to the fascia iliacus, which contains the femoral nerve.¹⁴

Measurement of pain in children was difficult,

especially when most of them could not be assessed by the research nurses due to the prolonged pain-free period. Some patients went home before the first analgesic was required. Measurement bias was minimized by training parents to use a standard scale (CHBOPS), which has been cross-validated in our culture.¹² A test of parents' ability to use CHBOPS yielded high agreement with research nurses and ease in scoring. In addition, the results showed that the proportion of patients who required analgesic within 4 and 6 hours showed a similar trend to those within 2 hours, which were recorded by research nurses.

In summary, this study showed that wound instillation of 0.5% bupivacaine 0.25 mL/kg with epinephrine 5 µg/mL could provide effective postoperative pain relief after inguinal hernia repair and hydrocelectomy. A difference between instillation technique and ilioinguinal iliohypogastric block could not be demonstrated in this study. A short instillation time of 20 seconds is as effective as 60 seconds.

Acknowledgment

The authors thank the Siriraj Research Development Fund and Senior Research Scholar, the Thailand Research Fund for financial support. We also thank all staff and residents of the Pediatric Surgical Unit for their cooperation, Dr. Chulaluk Komoltri for statistical analysis, and Professor Shusee Visoly-abutra and Professor Thara Tri-trakarn for their valuable suggestions.

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were characterized as *stx2/stx2vh-a* by PCR-restriction fragment length polymorphism.

To our knowledge, this is the first HUS case in our country in which the source of infection was identified. No investigation was conducted to trace back the source of the ground beef. This study illustrates the importance of the surveillance of STEC infections and the usefulness of molecular subtyping techniques, such as PFGE and phage typing, to determine the relatedness of strains and assess epidemiologic associations.

The public should be made aware that hamburgers, even when prepared at home, can be a source of infection. A primary strategy for preventing infection with *E. coli* O157:H7 is reducing risk behaviors through consumer education (10).

Acknowledgments

We thank Patricia Griffin for her review and helpful comments on earlier draft.

This work was supported by grants from Centers for Disease Control and Prevention (USA) and Fundación Alberto J. Roemmers (Argentina).

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Q Fever in Thailand

To the Editor: *Coxiella burnetii*, a strict intracellular bacterium, is the etiologic agent of Q fever, a worldwide zoonosis. Humans are infected by inhaling contaminated aerosols from amniotic fluid or placenta or handling contaminated wool (1). The bacterium is highly infectious by the aerosol route. Two forms of the disease are typical: acute and chronic. Acute Q fever is the primary infection and in specific hosts may become chronic (1,2). The major clinical manifestations of acute Q fever are pneumonia and hepatitis. Less common clinical manifestations are aseptic meningitis and/or encephalitis, pancreatitis, lymphadenopathy that mimics lymphoma, erythema nodosum, bone marrow necrosis, hemolytic anemia, and splenic rupture (2). The main clinical manifestation of the chronic form is culture-negative endocarditis, but infection of vascular grafts or aneurysms, hepatitis, osteomyelitis, and prolonged fever have also been described (1,2). Fluoroquinolones, co-trimoxazole, and doxycycline are active against *C. burnetii* in vitro, and ceftriaxone has been shown to have a bacteriostatic effect and could be effective in the phagolysosome of *C. burnetii*-infected cells (3). However, the treatment of choice for Q fever is doxycycline.

The incidence of this disease is largely unknown, especially in Asia. Q fever has been reported from Japan and China (1). Seroepidemiologic surveys have shown that subclinical infection is common worldwide. Large outbreaks of Q fever have also been reported in many countries in Europe (4). A case series of acute Q fever was diagnosed in a prospective study in patients with acute febrile illness who were admitted to four hospitals in northeastern Thailand: Udornthani Hospital, Udornthani Province; Maharat Nakhon Ratchasima Hospital, Nakhon Ratchasima Pro-

vince; Loei Hospital, Loei Province; and Banmai Chaiyapod Hospital, Buri Ram Province. Two serum samples were taken from these patients, on admission and at a 2- to 4-week outpatient follow-up visit, and stored at -20°C until serologic tests were performed at the Faculty of Medicine Siriraj Hospital, Mahidol University, and the National Research Institute of Health, Public Health Ministry of Thailand. All serum samples were tested for the serologic diagnosis of leptospirosis, scrub typhus, murine typhus, and dengue infection as previously described (5,6). After these serologic tests were performed, serum samples from patients with unknown diagnosis were sent for the serologic test for Q fever at Unité des Rickettsies, Faculté de Médecine, Marseille, France. The microimmuno-fluorescent antibody test, using a panel antigen of *C. burnetii*, *Rickettsia honei*, *R. helvetica*, *R. japonica*, *R. felis*, *R. typhi*, *Bartonella henselae*, *B. quintana*, *Anaplasma phagocytophila*, and *Orientia tsutsugamushi*, was used as described previously (6).

A total of 1,171 serum specimens from 678 patients were tested for Q fever. Nine patients (1.3%, eight male and one female) fulfilled the diagnosis of acute Q fever. The median age was 42 (range 15–62) years. All patients were rice farmers, and their farm animals were chicken and cattle. The median duration of fever was 3 (range 1–7) days before admission into the hospital. When initially seen,

all patients had acute febrile illness, headache, and generalized myalgia (i.e., a flulike syndrome). Clinical manifestations of acute Q fever in these patients ranged from this flulike syndrome (three patients), pneumonitis (one patient), hepatitis (two patients), pneumonitis and renal dysfunction (one patient), hepatitis and renal dysfunction (one patient), to severe myocarditis and acute renal failure (one patient). An epidemic of leptospirosis has been occurring in Thailand since 1996 (7). All patients in this study received a diagnosis of either leptospirosis or acute fever of undefined cause; therefore, empirical therapy, including penicillin G sodium, doxycycline, and cefotaxime or ceftriaxone, was administered. The patient with hepatic and renal dysfunction was treated with co-trimoxazole. The patient who had severe myocarditis and acute renal failure was treated with a penicillin G sodium and doxycycline combination. He also received a dopamine infusion and hemodialysis. The median duration between admission and a reduction of fever was 3 days (range 1–7) in this case series.

Results of several seroprevalence studies, using the complement fixation test, conducted in both humans and animals suggest that *C. burnetii* infection has been widespread in Thailand since 1966 (8). The prevalence in asymptomatic persons varies from 0.4% to 2.6% (9), and studies in domestic animals show that the highest prevalence of this infection occurs

in dogs (28.1%). The prevalence in goats, sheep, and cattle varies from 2.3% to 6.1% (9). However, this clinical case series of acute Q fever is the first diagnosed in this country. The disease was diagnosed in patients in four hospitals, situated in various parts of the northeastern region of Thailand. These data confirmed that Q fever is widespread in this country. The disease had been unrecognized previously because the specific serologic test was not widely available in Thailand.

A self-limited course was suspected in four cases in this series. However, severe cases, especially those with myocarditis, could be fatal. Therefore, doxycycline should be an empirical therapy for patients with acute febrile illness in areas where leptospirosis, scrub typhus, and acute Q fever are suspected, such as in rural Thailand. Further studies to investigate the epidemiology of Q fever in this country are needed.

Acknowledgement

This work was part of research supported by grants from Thailand Research Fund, Thailand.

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Correction, Vol. 9, No. 8

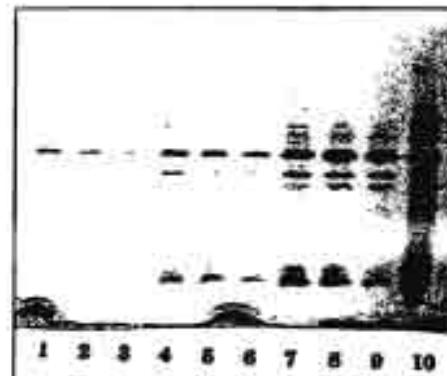
In "Emerging Pathogens of Wild Amphibians in Frogs (*Rana catesbeiana*) Farmed for International Trade," by Rolando Mazzoni et al., errors occurred in the figure legend on page 996.

The correct caption to the Figure appears below:

Figure. a and b, histopathologic findings from infected frogs. Characteristic sporangia (s) containing zoospores (z) are visible in the epidermis (asterisk, superficial epidermis; arrow, septum within an empty sporangium; bar, 10 μ m). c, Skin smear from infected frog, stained with 1:1 cotton blue and 10% aqueous potassium hydroxide (aq KOH) (D, developing stages of *Batrachochytrium dendrobatidis*; arrow, septum within a sporangium; bar, 10 μ m). d, Electron micrograph of an empty sporangium showing diagnostic septum (arrow) (bar, 2 μ m).

Correction, Vol. 9, No. 8

In the article "NmcA Carbapenem-hydrolyzing Enzyme in *Enterobacter cloacae* in North America," by Sudha Pottumarthy et al., an error occurred in the quality of the printing of Figure 3. A revised figure appears below. A color version is available from: URL: <http://www.cdc.gov/ncidod/EID/vol9no8/03-0096-G3.htm>



We regret any confusion this error may have caused.

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Original Article

บินต์กันบัน

การให้บริการผู้ติดเชื้อเอดส์ให้กับ กับโรงพยาบาลศิริราช

วิชาภาษาไทย พลเมืองที่•

ឧបនគរណ៍ កិច្ចការអាមេរិក**

วิษณุ ธรรมลิพิตากล

“ก้าวเดินไปในทิศทางเดียวกัน” คือการเดินทางที่มุ่งหน้าไปในทิศทางเดียวกัน

ANSWER

ກ່າວກົງ: ການຕິດເບືອນຂອງໄລ້, ເລກ໌, ປ່ຽນກັນສ້າງເນ, ການຫ້ານຂອງໄລ້...

๖๗๔

โรคติดเชื้อไวรัสที่ก่อการพ่ายแพ้ของภูมิคุ้มกันในมนุษย์ (Human Immunodeficiency Virus; HIV) เป็นปัจจัยสำคัญที่ส่งผลกระทบต่อสุขภาพของประเทศไทย โดยเป็นสาเหตุ

ปีที่ฝ่ามายังมีการศึกษาที่แสดงว่าผู้ป่วยติดเชื้อเชื้อเอชไอวีที่ได้รับการรักษาด้วยยาต้านไวรัสที่เหมาะสมจะมีค่าอยุ่ชั้นของผู้ป่วย สามารถลดลงหรือหายขาด ลดอัตราป่วยจาก การติดเชื้อลงอย่างมาก ลดการใช้ยาต้านไวรัสและป้องกัน การติดเชื้อลงอย่างมาก ลดโอกาสที่ต้องรักษาตัวในโรงพยาบาล และเพิ่มคุณภาพชีวิตรของผู้ป่วยได้¹⁻⁴ ในระหว่าง ๐๐ ปีที่ผ่านมา ผู้ป่วยกันคนที่มีการติดเชื้อ เชื้อเอชไอวี มากได้รับเฉพาะการป้องกันและการรักษาไว้ ติดเชื้อลงอย่างมากเพลิน ไม่ได้รับยาต้านเชื้อเอชไอวี เป้องจากมีราคากลางมาก ระบบดังกล่าวซึ่งไม่เหมาะสมเพื่อการรักษาผู้ป่วยที่ไม่ได้รับการรักษาด้วยยาต้านเชื้อเอชไอวี จะไม่สามารถมีอุบัติคุณกันป่วยติดเชื้อลงอย่างมากและซึ่งมีการติดเชื้อลงอย่างมากในประเทศไทยและซึ่งมีการติดเชื้อลงอย่างมากในประเทศไทย ได้ตลอดเวลา รวมทั้งการดำเนิน โรคติดเชื้อเชื้อเอชไอวี ที่จะรุหะหน้าไปเรื่อยๆ และผู้ป่วยที่ เสียชีวิตภายใน ๕ ปีภายหลังเริ่มมีอาการ นอกจากมี การรักษาไว้ติดเชื้อลงอย่างมากสูงซึ่งมีค่าใช้จ่ายสูงมาก เช่น การติดเชื้อศัลย์ไตรเนกเกจไตรไวรัส การติดเชื้อ ครีอิค์โคลค็อกท์ การติดเชื้อเมลิกไบแบคทีเรียที่ไม่ควรแบบ เป็นต้น โรคติดเชื้อลงอย่างมากสูงซึ่งมีค่าใช้จ่ายสูง เช่นชีวิตอย่างรวดเร็วหรือพิการ เช่น ตามอย่างการ ติดเชื้อศัลย์ไตรเนกเกจไตรไวรัส.

ในปัจจุบันยาต้านเชื้อไวรัสราคาก็ถูกมาก และประเทศไทยสามารถผลิตได้เอง. ดังนั้นก่องทุกประภัยกับสังคมจะจะพิจารณาความยาต้านเชื้อไวรัสในชุดสิทธิ์ประจำไขชน์สำหรับผู้ประกันตนที่มีการติดเชื้อเชื้อไวรัส แม้จะตั้งแต่ปี พ.ศ. ๒๕๖๖ สำนักงานประกันสังคมจะจัดสร้างงบประมาณเพิ่มเติมให้กับส่วนพยาบาลที่ลงทะเบียนผู้ป่วยติดเชื้อเชื้อไวรัส ซึ่งจัดเป็นโควิดเชื้อรังโควิดมีใน ๒ โควิดที่ลงทะเบียนก็ตาม. งบประมาณที่ส่วนพยาบาลได้รับเพิ่มเติมก็ยังไม่เพียงพอ ต่อการให้การรักษาผู้ป่วยติดเชื้อเชื้อไวรัสและผู้ป่วยเกิดขึ้นทั้งหมดไม่ได้รับยาต้านเชื้อไวรัสจากส่วนพยาบาลด้วยงบประมาณดังกล่าว. ศันษายังคงทำการศึกษาโดยมีวัตถุประสงค์ เพื่อประเมินจำนวนและศักยภาพในการ

รักษาพยาบาลอยู่ที่ศูนย์เชื้อเชื้อไข้ไวรัสที่ประจำกันคนกับไวรัสพยาบาลศูนย์ริราช และเปรียบเทียบค่าใช้จ่ายในการให้บริการโดยไม่ได้รับค่าตอบแทนเชื้อไข้ไวรัสกับทุ่งที่ให้บริการโดยให้ค่าตอบแทนเชื้อไข้ไวรัสเพื่อประกันการศึกษาและรวมบท้านของไข้ไวรัสในประเทศไทยที่ประจำอยู่ของกองทุนประจำกันสังคม.

תְּאַתִּים

ศึกษาจากเวชระเบียนของผู้ป่วยกันคนกันไว้
พยาบาลติดไวรัส และรับบทการติดไวรัสพยาบาลติดไวรัส
ระหว่างวันที่ ๐ มกราคม ถึงวันที่ ๓๐ ธันวาคม พ.ศ. ๒๕๖๖
เฉพาะที่เกี่ยวข้องกับการติดเชื้อเชื้อไวรัส เท่านั้น ไม่
รวมถึงความเจ็บป่วยอื่นๆ ที่ไม่เกี่ยวข้องกับการติดเชื้อ
เชื้อไวรัส เช่น อุบัติเหตุ เป็นต้น นำเข้ามูส เพศ อาชญา
กรรมทั่วไป การรับยาท้านเชื้อไวรัส และค่าใช้จ่าย
ในการรักษาพยาบาลของผู้ป่วย น้ำวิเคราะห์โดยใช้สอดดิ
เพิ่มพูนอีก

Classification

ในรอบปี พ.ศ. ๒๕๕๘ มีผู้เอาประกันตนกับโรงเรียนจำนวนกว่า ๕๐,๐๐๐ คน และมีผู้มาใช้บริการประกันน้ำเงิน ๒๐,๐๐๐ คน ซึ่งรวมผู้ป่วยที่ติดเชื้อเอชไอวี ๒๖๔ ราย (ร้อยละ ๐.๑ ของผู้ที่มาใช้บริการทั้งหมด) ของผู้ประกันตนกับโรงเรียนจำนวนกว่า

การวิเคราะห์เจาะเป็นช่องๆปัจจัยที่มีการติดเชื้อ เชื้อไอวี, 200 ราย (ร้อยละ 40) พบเชื้อยูส ทั้งปี

๙. ตั้งงบประมาณไว้ในเบื้องต้นปีงบประมาณ

ចូបាយបើបានចាប់ ៨៣២ រាយ (វិរីតិ៍ ៦៤) ឡើងបើបាន
អាចី ៨៣ រាយ (វិរីតិ៍ ៧៤), ចាប់ឱ្យតើ ៩៤៣ រឿង (ការ
បើកចុះរាយការទ្វាន ៨ រឿង, គាត់ត្រូវ ២០ រឿង, គាត់សុងត្រូវ ៦០
រឿង).

๔. จำนวนผู้ป่วยที่ควรได้รับยาด้านเครื่องไม้เครื่องมือ

ผู้ป่วย ๓๗๔ ราย (ร้อยละ ๔๖) มีเชื้อปั๊บเชื้อเดียว ที่สมควรให้รับยาต้านเชื้อไวรัส คือมีจำนวนเชื้อตัว CD4 น้อยกว่า ๒๐๐, มีอาการของเชื้อตัว หรือมีการติดเชื้อ

รายโดยการ. ผู้ป่วย ๗๗ ราย (ร้อยละ ๖.๖) ไม่มีข้อบ่งชี้ว่าจำเป็นต้องได้รับยาด้านເຊົາໄອວີ. ผู้ป่วยอีก ๑๕ ราย ไม่มีข้อมูลเพียงพอที่จะพิจารณาได้ว่ามีข้อบ่งชี้ที่จะได้รับยาด้านເຊົາໄອວີหรือไม่. หากกรณีผู้ป่วยกลุ่มนี้ได้รับยาด้านເຊົາໄອວີจำเป็นต้องได้รับยาด้านເຊົາໄອວີ จะทำให้มีผู้ป่วยที่ควรได้รับยาด้านເຊົາໄອວີจำนวนทั้งสิ้น ๑๙๐ ราย (ร้อยละ ๗๗).

๙. การมารับบริการและค่าใช้จ่ายของผู้ป่วย การมารับบริการแบบผู้ป่วยนอกและค่าใช้จ่าย

ผู้ป่วยมารับบริการแบบผู้ป่วยนอกรวม ๑,๖๙๙ ครั้ง. เดือนละ ๔.๙ ครั้ง/เดือน/ปี. ไทยมีค่าใช้จ่ายในการรักษาทั้งหมด ๔๔๒,๐๘๐ บาท คิดเป็นค่าเดือน ๓๙๐ บาท/เดือน (ค่าท่าสุทธิ ๐ บาทและค่าสูงสุด ๘๘๘๘ บาท) หรือคิดเป็นค่าเดือน ๔๔๒๐ บาท/เดือน/ผู้ป่วย ๐ ราย.

การมารับบริการแบบผู้ป่วยในและค่าใช้จ่าย

ผู้ป่วยจำนวน ๕๙ ราย (ร้อยละ ๒๗) ได้รับการรักษาในโรงพยาบาลโดยมีจำนวนครั้งของการอยู่ในโรงพยาบาลรวมทั้งสิ้น ๑๙ ครั้ง คิดเป็น ๐.๔ ครั้ง/เดือน/ผู้ป่วย ที่รับให้รักษาในโรงพยาบาลทั้งปี หรือ ๐.๓ ครั้ง/เดือน/ผู้ป่วยทั้งหมดทั้งปี. ระยะเวลาของ การรักษาในโรงพยาบาลรวมทั้งสิ้น ๖๗๗ วัน ไทยมีระยะเวลาเฉลี่ย ๑๔.๔ วัน/เดือนของการอยู่ในโรงพยาบาล ๐ ครั้ง หรือ ๗.๗ วัน/เดือน/ผู้ป่วย ๐ ราย/เดือน. ค่าใช้จ่ายในการรักษาทั้งหมด ๐,๙๐๐,๔๘๐ บาท โดยคิดเป็นค่าเดือน ๑๗,๐๘๔ บาท/เดือน การรักษาในโรงพยาบาล ๐ ครั้ง หรือคิดเป็นค่าเดือน ๗๗๗,๔๗๐ บาท/เดือน/ผู้ป่วยที่ต้องรักษาในโรงพยาบาล ๐ ราย/เดือน.

ค่าใช้จ่ายรวม

ค่าใช้จ่ายในการรักษาผู้ป่วยทั้งหมดรวมเป็นเงิน ๒๖,๐๘๔,๔๗๖ บาท/เดือน.

วิเคราะห์

ผู้ประับกันคนกับโรงพยาบาลศิริราชรายที่มีการคิดเบื้องตนໄອວີ มีอัตราการมารับบริการและค่าใช้จ่ายในการรักษาพยาบาลสูงกว่าผู้ประับกันคนทั่วไปที่ไม่มีการคิดเบื้องตนໄອວີ ในระยะเวลาเดียวกัน กล่าวคือ ผู้

ประับกันคนทั่วไปของโรงพยาบาลศิริราชในปี พ.ศ. ๒๕๕๘ มารับบริการแบบผู้ป่วยนอกประมาณ ๐.๙ ครั้ง/เดือน/คน/ปี โดยมีค่าใช้จ่ายเฉลี่ยประมาณ ๑๖๐ บาท/เดือน/คน. ผู้ประับกันคนทั่วไปได้รับการรักษาในโรงพยาบาล ๑๖๐ เดือน/ปี ประมาณ ๐.๖๙ ครั้ง/เดือน/คน/ปี หรือประมาณ ๓๙๐ วัน/เดือน/คน/ปี. โดยมีระยะเวลาเฉลี่ยของการอยู่ในโรงพยาบาลประมาณ ๗ วัน. และค่าใช้จ่ายเฉลี่ยที่ต้องหักของ การรักษาในโรงพยาบาลประมาณ ๑๓,๗๐๔ บาท.^{๑๗๘}

ค่าใช้จ่ายในการรักษาผู้ป่วยประับกันคนทั่วไปของโรงพยาบาลศิริราชที่มีการคิดเบื้องตนໄອວີทั้งหมดรวมเป็นเงิน ๒๖,๐๘๔,๔๗๖ บาท/เดือน. ค่าใช้จ่ายทั้งหมดนี้ เป็นค่าใช้จ่ายเฉพาะค่ารักษาพยาบาลรวมโดยรวม (direct medical cost) เท่านั้น. ยังไม่ได้รวมค่าใช้จ่ายที่ไม่เกี่ยวกับการรักษาโดยตรง (เช่น ค่าเดินทาง ค่าอาหาร ค่าที่พักของผู้ป่วยและญาติจากภาระที่มารับบริการที่โรงพยาบาล). ค่าใช้จ่ายอื่นๆ ที่เป็น indirect cost เช่น ค่าสูญเสียที่เกิดจากภาระงาน และจากภาระทางเดิน วัยอันควรซึ่งมีบุตรค่ามากกว่า ๐ ล้านบาท และ intangible cost (ค่าใช้จ่ายที่เกิดจากความเสื่อมป่วยทางจิตใจและทางสังคม รวมทั้งคุณภาพชีวิตของผู้ป่วยที่ไม่ได้รับการรักษาทั้งยาด้านເຊົາໄອວີ) ดังนั้นค่าใช้จ่ายโดยรวมใน การรักษาผู้ป่วยโดยไม่ให้ยาด้านເຊົາໄອວີ (direct medical cost + indirect cost) จะประมาณไม่ได้กว่า สามล้านบาท. ยังหากผู้ป่วยได้รับการรักษาด้วยยาด้านເຊົາໄອວີ คงต้องเพิ่มในระดับแรก ประมาณค่าใช้จ่ายจากการรักษาพยาบาลและความเสื่อมป่วยที่เกี่ยวข้องกับการคิดเบื้องตนໄອວີ ลงได้ถึงยังน้อยร้อยละ ๕๐.

ค่าใช้จ่ายในการรักษาผู้ป่วยด้วยยาด้านເຊົາໄອວີที่มีประสาทวิภาคทุงตือ stavudine, lamivudine และ nevirapine โดยบริหารยาใน ๒ ลิปสัมภาระแยกด้วยยา ๒ ชานานทั้งกล่าว豫กันคิดเป็นค่าใช้จ่ายประมาณ ๐,๕๐๐ บาท. หลังจากนั้นจะได้รับยา GPOvir (Stavudine + Lamivudine + Nevirapine ในเม็ดเดียวกัน) กินวันละ ๒ ครั้ง คิดเป็นเงินประมาณ ๐,๖๐๐ บาท (ผู้ป่วยน้ำหนักตัวกิโลกรัม ๖๐ กิโลกรัม) ถึง ๐,๗๐๐ บาท (ผู้ป่วย

น้ำยาบังคับความถูกกรา ๒๐ กิโลกรัม) ท่อเทือน ตั้งนั่นค่ายาต้านเชื้อไวรัสท่อคันท่อปีประมาณ ๑๕,๖๐๐ บาทเมื่อ ๑๖,๖๖๐ บาท หรือวันละประมาณ ๔๐ บาท ผู้ป่วยที่ได้รับยาท้านเชื้อไวรัส ควรได้รับการตรวจร่างกายบ่อยครั้ง CD4 มีตัว ๒ ครั้งติดเป็นค่าใช้จ่ายประมาณ ๑,๐๐๐ บาท และควรได้รับการตรวจทางท้องถ่ายบุเดือนๆ ปีตัว ๑-๔ ครั้งติด เป็นค่าใช้จ่ายประมาณ ๒๐๐ บาท ตั้งนั่นค่าใช้จ่ายในการรักษาผู้ป่วยที่ติดเชื้อเชื้อไวรัส ตัวยาท้านไวรัสโดยผู้ป่วยไม่มีภาวะแทรกซ้อนจาก การรักษาทั้งยาตั้งแต่ตัว และไม่มีภาวะเชื้อตื้อหายจะประมาณปีตัว ๑๖,๖๐๐ ถึง ๑๘,๖๖๐ บาท คิดเป็นค่าใช้จ่ายวันละ ๕๖ มิล ๕๐ บาท ตั้งนั่น หากผู้ประภันคนกับโรงพยาบาลศรีราชนในปีท.ศ. ๒๕๕๔ ที่มีการติดเชื้อเชื้อไวรัส ได้รับยาท้านเชื้อไวรัส ติดเป็นค่าใช้จ่ายประมาณ ๑๖,๖๖๐,๖๐๐ บาท ซึ่งมีตัว ๔ คุณค่าเมื่อเปรียบเทียบเทียบค่าใช้จ่ายในการรักษาผู้ป่วยโดยไม่ได้ให้ยาท้านเชื้อเชื้อไวรัส กับผลตื้อตันๆ ที่ไม่สามารถแบ่งเป็นค่าใช้จ่ายโดยตรงได้ เช่น คุณภาพที่วิเคราะห์ผู้ป่วย รักษากับการรักษา บันทึก (productions) รายการที่รักษา บันทึก

สำหรับผู้ป่วยที่ไม่สามารถใช้ยาดังกล่าวได้เป็น
จากแพ้ยา (แพ้ได้น้อย) หรือจากการติดเชื้อตื้อชาด
ดังนั้นแพทย์จึงต้องใช้ยาอื่นๆ ทดแทน เช่น

ดังนั้นสำนักงานประดับสังคมควรพิจารณาให้ผู้ประดับศพสามารถเป็นข่ายยาด้านเชื้อไวรัสจากกองทุนประทับศพของไปรษณีย์ ไม่ใช่ของรัฐ

๖. การรักษาด้วยยาด้านอื่นเช่นไอกีป่าจะคุ้มค่าหากช้อนบุหรี่เป็นองค์ทั้งในรายจานนี้.

๔. ค่าใช้จ่ายของการรักษาด้วยยาที่กานเชื้อไวรัสปัจจุบันประมาณวันละ ๔๐ บาทเท่านั้น และมีแนวโน้มร่วงลดลงอีก ซึ่งค่าใช้จ่ายดังกล่าวมีไปเพื่อการซักค่าใช้จ่ายในการรักษาโรคเรื้อรังอีกด้วย แทน โรคภัยหัวใจ โรคความดันโลหิตสูง ซึ่งมีจำนวนผู้ป่วยมากกว่าผู้ป่วยที่ติดเชื้อเชื้อไวรัส และผู้ป่วยเหล่านี้ก็ต้องการการรักษาตลอดทั้งวันัน

๒. ดำเนินการซ่อมบำรุงทั่วไปของเครื่องจักรและอุปกรณ์

ก้าวสำคัญในการรักษาผู้ป่วยโรคอื่นๆ ที่สำนักงานประกับสังคมรับผิดชอบคือใช้จ่ายเพิ่มเติมของถูกในปัจจุบัน เช่น ภารกิจใหม่ในระบบสุขภาพในผู้ป่วยให้หายเรื้อรัง (ประมาณมูลค่า ๔๐๐,๐๐๐ บาท), การรักษาผู้ป่วยมะเร็งตัวอย่างเป็นปัจจุบัน (ประมาณมูลค่า ๔๐,๐๖๐ บาท) การเปลี่ยนไฟและภารกิจที่ใช้กระแสไฟฟ้ารวมทั้งภารกิจที่ดำเนินการตัวเดิม.

๔. ຖົດກາທີ່ວິດແລະ ພົມສີຫອງເງື່ອປ່າຍຕິດເຫຼືອ
ເຂົ້າໄວ້ ຕີໄດ້ຮັບກາງວັດຍາດ້ວຍບາດ້ານເຂົ້າໄວ້ ປ່າຍຕິດ
ກວ່າເງື່ອປ່າຍໄວ້ກ່າວໆ ທີ່ກ່າວ້າເນີນໃນຫຼຸດ ແລະ ຕ ເນື່ອ
ຈາກເງື່ອປ່າຍທີ່ຕິດເຫຼືອເຂົ້າໄວ້ ມັກມີອາຍຸນຸ້ອຍກວ່າເງື່ອປ່າຍໄຣ
ເວີ້ອວັນເຄື່ນໆ (ອາຍຸເພື່ອຫຍອງເງື່ອຕິດເຫຼືອເຂົ້າໄວ້ ປ່າຍນານ ຕະ
ປີ) ແລະ ປ່າຍທີ່ກ່າວໄປຫຼຸດໄດ້ສັງຄນໄດ້ກາກກວ່າແລະນານ
ກ່າວ້າ

๔. องค์การอนามัยโลกได้บรรจุยาต้านเชื้อไวรัสฯ ชนิดที่ก่อภารmessingไว้ในรายการยาพื้นฐานของประเทศ (Essential Medicines Model List) เมื่อต้นปี ๒๐๐๓ แล้ว.

๔. มีแนวโน้มว่าชาต้านे�ชไอร์จะถูกบรรดอยู่ในบัญชียาห์กแห่งชาติของประเทศไทย โดยกรรมความคุ้มโลก การตรวจสอบรายการสุขได้ขอให้คณะกรรมการการพัฒนาบัญชียาห์กแห่งชาติตรวจสอบบรรดญาต้านे�ชไอร์ในบัญชียาห์กแห่งชาติ เป็นอย่างต่อไปนี้ ให้สถานพยาบาลของกระทรวงสาธารณสุขสามารถรับใช้บัญชีรายการของรัฐบาลต่อไปดังนี้

中上ナガノ

หากสำนักงานป่าไม้กับสังคมจะรับมืออย่างไรให้เข้ากับ
ของยาหานเชื้อไวรัสที่เริ่มผุแตกป่าไม้กันคน สำนักงาน
ป่าไม้ก็ต้องหันมาศึกษาเรื่องความต้องการที่แท้จริงของ
ผู้คนที่ต้องการใช้ประโยชน์จากป่าไม้ ไม่ใช่แค่การห้ามหอบห้าม

๙. ร่องรอยที่หลงเหลือในวัฒนธรรมไทย

จากขอรับอนุญาตของสำนักงานประวัติสังคมในรอบปี ๒๕๕๘ ถึงปีประวัติสังคมกับสำนักงานประวัติสังคมทั้งสิ้น ๕๔ สำนักงาน ให้ยกเว้นสิ่งของที่เป็นเครื่องเรื่องทางการเมืองตัดต่อเจ้าของไว้ประมวล ๕,๐๐๓ ราย (ร้อยละ ๐.๙) อย่างไรก็ตาม ศูนย์ป้ายที่ลงทะเบียนนี้มีการตัดต่อเจ้าของไว้

เป็นชั้นนานั้นผู้ป่วยที่มีอยู่ที่สุภาพท่านนั้น กจะจะมีผู้ประจำกับคน
และมีการติดเชื้อเช่นไอล์วิธิกส่วนที่มีงตัวไม่ได้มีมาสรับ
บริการจากสถานพยาบาลที่รับทะเบียนนี้ไว้ เมื่อจะจาก
บ้านชั้นทางฯ เช่น บ้านด้านนอกไอย่ก็มีได้วางอยู่ในบุคคลเดียว
ประจำอยู่ที่สุภาพรับผู้ป่วยกับคน. ไม่ต้องการเมียหรือภรรยาคน
ป่วยเป็นโรคนี้ เป็นต้น. หากส่วนนักงานประจำกับสังคม
ต้องการค่าตอบแทนก้อนค่าใช้จ่ายที่แนบมาที่จำเป็นต้อง^{จะ}
ศึกษาว่าผู้ป่วยติดเชื้อเช่นไอล์ ที่มีได้มาลงทะเบียนไว้
เชื้อไว้ไม่นาน-น้อยเทียบกับ ในการมีค่าครัวชั้นนานั้น
ผู้ป่วยติดเชื้อเช่นไอล์ทั้งหมดไม่เกิน ๑๐,๐๐๐ ราย.

สำหรับงานวันถัดไปที่จะเพิ่มขึ้นในแต่ละปี ยังไม่ทราบได้ชัดเจน แต่สำนักงานประภากันตั้งคณะกรรมการทราบข้อมูลเบื้องต้นได้จาก การเบริกบานเพื่อป้องกันภัยติดเชื้อเช่นไวรัสโคโรนาไว้ในปี พ.ศ. ๒๕๖๔ เพื่อกันไว้ พ.ศ. ๒๕๖๕ สำหรับผู้ประภากันทันทีในพยานาถศิริราชและติดเชื้อเช่นไวรัสโคโรนาเพิ่มขึ้นประมาณวันละ ๕ ในปี ๒๕๖๕.

๒. ภาระทางการเงินของบ้านเมือง

ร้อยเปอร์เซ็นของการให้ยาต้านเชื้อไวรัสได้แก่ ผู้ป่วยที่มีจำนวนเชลล์ CD4 น้อยกว่า 400. หรือ ผู้ป่วยที่มีอาการรุนแรง得多ที่สุด. หรือผู้ป่วยที่มีการติดเชื้ออย่างมาก. หากให้ยาป้องกันนี้ จะมีจำนวนผู้ที่ควรได้รับยาต้านเชื้อไวรัสลดลง 50% หรือประมาณ 5,000 หรือ 5,500

๗. ประการของยาที่อยู่ในชุดสิทธิประโยชน์

ผู้ป่วยควรได้รับการรักษาด้วยยาาร่วมกัน ค รับน้ำยาพิบูลย์ที่ควรอยู่ในชุดเดิมประโภค์ คือ, stavudine, lamivudine และ nevirapine เมื่อจะเป็นยาต้มประโภคก็ต้องบีบ ราคาว่าไม่แพง และสามารถ

ผลิตได้ในประเทศไทยโดยองค์การเภสัชกรรม. สำหรับผู้ป่วยที่แพ้ยา (โดยเฉพาะ, nevirapine ซึ่งพบการแพ้บ่อยกว่ายาอื่น ๆ ขนาด). ที่รือติดเชื้อเอชไอวีที่ต้องยาหงอกฟ้า. ที่จำเป็นต้องใช้ยานานนั้นนิยม ซึ่งจะรักษาให้ยากร้าวและห้องใช้ยาที่มีราคาแพงมาก และควรให้รักษาห้องจากผู้ป่วยรายอื่น. สำนักงานประทับนั่งคนครัวรับผิดชอบสำหรับยา (โดยเฉพาะยาที่นิยม ต. ขนาดทึบก่อสร้างและยา zidovudine ซึ่งใช้ในการป้องกันการติดเชื้อเอชไอวีของพาร์ทเนอร์ในครรภ์.

๔. ภาระมากที่ต้องใช้ และรับภาระของการซื้อขายแผนกฯ ให้เข้ากับที่มีอยู่ในสถานภาพปัจจุบัน.

๕. การพัฒนาศักยภาพและการพัฒนาปรัชญาฯ

สำนักงานประภันสังคมฯ ต้องมีระบบให้สถานพยาบาลทุกแห่งที่รักษาผู้ป่วยติดเชื้อเอชไอวีมีระบบการบันทึกข้อมูลที่แม่นยำและครบถ้วนตามแบบบันทึกข้อมูลที่สำนักงานประภันสังคมจัดทำขึ้น เป็นอย่างมาก ผู้ป่วยจะต้องได้รับการรักษาทั่วไปที่ถูกต้องและป้องกัน

พากษา

ເລືອນໄຫວ	ຍາກປ່ຽນມາພ່ອຄົງ (ສ້າງນາມ)
ຮາບອະນຸໄໝເກີນ ២០,០០០ ບາກຄ່ອນປີ ຈໍານວນ ៥,០០០ ໣	៥០
ຮາບອະນຸໄໝເກີນ ១៥,០០០ ບາກຄ່ອນປີ ຈໍານວນ ៥,០០០ ໣	១.៥៥

๔. การแก้ไขศูนย์และหัวเมืองการเมืองกับการพัฒนาเมืองอย่างยั่งยืนในที่ประทับคานทรี

สำนักงานประกำกันสังคมจะต้องมีระบบการถือเอกสาร
กับผู้ป่วยและผู้ประกันตนว่าการรักษาด้วยยาด้านเชื้อไวรัส
ไม่ได้เป็นการรักษาที่ให้ไว้คุณภาพขาด; การรักษาดัง
กล่าวเป็นเพียงการอับยิ้งไม่ให้เชื้อไวรัสเพิ่มเข้าในร่างกายเท่านั้น;
สำนักงานประกำกันสังคมจะต้องตั้งรับตัดและให้ความรู้แก่
ผู้ประกันตนในการป้องกันการติดเชื้อเช่น การ
หลีกเลี่ยงพฤติกรรมเสี่ยง ควบคู่ไปด้วย เพื่อป้องกันมิ
ให้ผู้เอาประกันตนต้องมาใช้ยาหากตนมีการติดเชื้อเช่นไวรัส
ที่จะได้รับการศูนย์ครองสำรักษาพยาบาล จึงไม่
จะมีความสะดวกทางด้านการเดินทาง.

ມີເລີດຕົກການໄດ້ກຳລົງ

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Abstract Social Security Service at Siriraj Hospital for HIV-infected Patients.

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Journal of Health Science 2003; 22:223-9.

There were 226 patients with HIV infections who were in the social security system and registered in Siriraj Hospital in 2001. Medical records of 203 patients were reviewed. Sixty-five percent of the patients were males. An average age was 32.8 years. Eighty-six percent of the patients had indications for receiving antiretroviral agents. There were 1,562 out-patient visits. The total cost for out-patient treatment was 948,141 baht and the average cost per out-patient visit was 660 baht or 4,670 baht per patient per year. Forty-seven patients were hospitalized in 84 admissions. The total cost for all hospitalizations was 1,100,491 baht and the total duration was 577 days. An average cost per admission was 13,194 baht or 23,413 baht per patient per year. The total direct medical cost was 2,048,572 baht. If all aspects of cost (direct medical, direct non-medical, indirect and intangible costs) were taken into account, provision of appropriate anti-retroviral agents to the eligible patients could be cost-effective. The social security scheme should consider providing antiretroviral agents to registered HIV infected patients.

Key words: HIV infection, social security, anti-retroviral agents

Risk Index for Predicting Complications and Prognosis in Thai Patients with Neutropenia and Fever

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Abstract

Background : New strategies in the treatment of febrile neutropenic patients have been proposed during the past decade. It is more and more widely accepted that febrile neutropenic patients are a heterogeneous population and they have varying risks for complications and death. However, most of the data have been collected from patients in Western countries. The purpose of the study was to identify types of infection and etiologic organisms in febrile neutropenic patients at Siriraj Hospital, Thailand, and also to develop a prediction model in order to identify patients who are expected to have a favorable outcome or a low-risk subset.

Method : The medical records of chemotherapy-induced neutropenic patients with fever hospitalized at Siriraj Hospital, Thailand, from January 1999 to December 2000 were analyzed. Data included patient characteristics, epidemiological data and the potential factors at the onset of fever for predicting patient outcome. A scoring system for predicting patients with favorable outcome was developed. The scoring system developed from this study was compared with a previously used scoring system.

Results : Of 220 patients with 267 febrile neutropenic episodes, 71.8 per cent had hematologic malignancies and 28.2 per cent had solid tumors. Bacteremia was found in 61 episodes (22.8%) and gram negative bacilli were the most common causative organism in bacteremia (88.6%). Overall mortality was 17.7 per cent. Multivariate analysis revealed that the factors predicting outcome were burden of illness, control of cancer, duration of neutropenia and dehydration. The scoring system developed from this set of data revealed that a score ≥ 16 identified patients with a favorable outcome with a specificity of 90.2 per cent, sensitivity of 76.6 per cent and positive predictive value of 85.4 per cent.

Conclusion : The causative organisms of bacterial infections in febrile neutropenic patients in Thailand are still gram negative bacteria. The locally developed risk index has a fair accuracy to identify patients with favorable outcome and may be used to identify patients suitable for less aggressive treatment strategies.

Key word : Agranulocytosis, Neutropenia, Febrile Neutropenia, Prognosis

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J Med Assoc Thai 2003; 86: 212-223

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Chemotherapy-induced neutropenia in cancer and hematologic malignancy patients is almost always associated with infections⁽¹⁾. This complication usually limits effective chemotherapeutic treatment in those patients. Neutropenic patients presenting with fever are usually treated empirically with broad-spectrum antimicrobials⁽²⁾. Despite such prompt treatment, the complications and mortality rate in febrile neutropenic patients remain high. In a large series, the mortality reported ranged from 4 per cent to 30 per cent of episodes⁽³⁻⁵⁾. In 1997, the Infectious Diseases Society of America (IDSA) developed guidelines for the use of antimicrobial agents in neutropenic patients with unexplained fever⁽⁶⁾. The guideline recommendation is to treat all patients with a homogeneous regimen. In most of the febrile neutropenic episodes, the causative organisms were unknown and bacteremia was identified in only 22 per cent-32 per cent of the patients in most reports^(5,7-12). Over the past decade, there has been a clear shift in the infecting organisms from gram negative bacilli to gram positive cocci in the United States and Europe, and currently 60 per cent-70 per cent of the episodes of bacteremia are due to gram positive cocci^(13,14).

Recent investigations suggest that neutropenic patients with fever are a heterogeneous population, with subsets with varying risks regarding response to initial therapy, development of serious medi-

cal complications and mortality. An increased understanding of febrile neutropenia over the past decade has given clinicians the ability to identify patients with expected favorable outcome or, in other words, these patients with a lower risk of serious medical complications or mortality. Talcott et al have developed a clinical prediction classifying patients into four risk groups. They suggested that neutropenic patients with controlled cancer and no serious comorbidity who develop fever in an outpatient setting are at low risk, with an expected rate of serious medical complications of less than 5 per cent⁽¹⁵⁾. The ability to differentiate reliably between favorable and unfavorable outcome subsets was further developed by the Multinational Association for Supportive Care in Cancer (MASCC) by using a scoring system. The characteristics used in the MASCC scoring system were burden of illness, no hypotension, no chronic obstructive pulmonary disease, solid tumor or no previous fungal infection, no dehydration, outpatient status and age less than 60 years. A score ≥ 21 can identify low-risk patients with a positive predictive value of 91 per cent, specificity of 68 per cent and sensitivity of 71 per cent⁽¹⁶⁾.

Because of the changing situation and new knowledge concerning febrile neutropenia, it has now become possible to evaluate not only the nature of empirical antibiotic therapy for such patients, but

also the setting in which such therapy is delivered (17-19). Many studies have shown that patients in a low-risk subset can be treated safely with oral antibiotics and/or as an outpatient (20-26).

Although several studies in the United States and Europe have been performed to investigate the causative organism and outcome in febrile neutropenic patients, data in developing countries is lacking. Kanitsap et al reviewed 147 patients with hematologic malignancy with 64 episodes of febrile neutropenia at Siriraj Hospital, Thailand, from January to June 1998. They found that 22 per cent of the patients had bacteremia and the most common causative pathogens identified from blood were gram negative bacilli which accounted for 18 per cent of all episodes of febrile neutropenia (82% of all bacteremia). However, this study did not identify the potential factors for predicting favorable outcome (12).

The purpose of this study was to identify the types of infection and etiologic organisms in febrile neutropenic patients and also to develop a prediction model to identify patients who are expected to have favorable outcome or a low-risk subset.

MATERIAL AND METHOD

Patients

Patients with febrile neutropenic episodes who were admitted to Siriraj Hospital, Thailand from January 1999 to December 2000 were included in the study. All of the patients' records which were coded for agranulocytosis (D70) using ICD-10 were reviewed. Patients who met the following eligibility criteria were included in the analysis: neutropenia (absolute neutrophil count < 500/ μ l) that was related to chemotherapy for hematologic malignancy or solid tumor, temperature greater than 38°C and age older than 12 years. Patients who received antibiotics for treating febrile neutropenic episodes concurrently with chemotherapeutic agents, and patients who died within 24 hours of admission were excluded.

Data extraction

The following data were extracted from the patients' medical records: patient's age, gender, underlying cancer, ECOG (Eastern Cooperative Oncology Group) performance status, number of courses and regimens of chemotherapeutic agents, use of growth factors and antibiotic prophylaxis, onset of fever at presentation, duration since the first day of the last episode of chemotherapy to hospitalization, duration of neutropenia, temperature, blood pressure, pulse rate

and respiratory rate. Laboratory data included total leukocyte count, absolute neutrophil count, absolute monocyte count, absolute phagocyte count, platelets, hemoglobin, blood urea nitrogen, creatinine, electrolytes, alanine transaminase, aspartate transaminase, alkaline phosphatase, total bilirubin, albumin, globulin and chest radiograph. Microbiological results and susceptibility profiles were also recorded for further analysis.

Operational definitions

Control of cancer

Control of cancer was assessed using the diagnostic information available in the medical records. For patients with leukemia, uncontrolled cancer was defined as the absence of documented complete remission. For patients with lymphoma or solid tumors, uncontrolled cancer was defined as either development of new lesions, ≥ 25 per cent enlargement of a measurable lesion while receiving chemotherapy or other evidence of treatment failure such as progressive cancer symptoms.

Burden of illness

Burden of illness was categorized into three groups. No or mild symptoms included patients who had no or minimal clinical signs and symptoms. Moderate symptoms included patients who had moderate clinical signs and symptoms with stable vital signs. Severe symptoms and moribund included patients who arrived bed-bound with clinical sepsis or who had unstable vital signs and needed close monitoring or intensive care.

Occurrence of fever

Occurrence of fever was categorized into outpatient or inpatient. The inpatient setting was defined as a patient who developed fever during his/her hospitalization or within 72 hours of discharge.

Co-morbidity

Co-morbidity was defined as significant blood loss requiring blood transfusion, respiratory failure needing intubation, altered mental state, presence of mucositis, presence of superficial fungal infection, diarrhea, abdominal pain, nausea/vomiting, central intravenous catheter insertion, dehydration requiring intravenous treatment, suspected spinal cord compression, severe pre-existing cardiac diseases, chronic pulmonary diseases, diabetes, history of surgery within 6 weeks, previous febrile neutropenia, previous in-

sive fungal infection, previous antifungal treatment within the last 6 months, previous antibiotic treatment within 7 days and other serious diseases.

Dehydration

Dehydration was defined as volume depletion, i.e. combined sodium and water deficit. Signs of volume depletion included one or more of the followings: reduced skin turgor, dry oral mucous membrane, decreased axillary sweating, postural hypotension, hypotension.

Classification of fever

Fever was classified into fever of unknown origin (FUO), clinically documented infection and microbiologically documented infection.

Outcome measure

Patients' final outcomes were categorized using the parameters of survival, serious complications, modification of initial treatment, relapse of fever within 5 days of resolution, and the time taken for the fever to resolve after starting antibiotics.

Patients were classified into two groups according to the outcome:

- Favorable outcome: Patients whose fever resolved within 5 days of starting treatment and without serious medical complications.
- Unfavorable outcome: Death from any causes or development of serious medical complications or modification of initial antibiotic treatment or relapse of fever after resolution or fever not yet resolved after 5 days of treatment.

Statistical analysis

The data were analyzed using descriptive statistics. Student's *t*-test or Mann-Whitney U test, Chi-square test or Fisher's exact test were used for univariate analysis. A multiple logistic regression model was used for multivariate analysis. All statistical tests were two-sided and $p < 0.05$ was considered significant. Based on the logistic model, a prediction score was calculated for each patient. Patients with scores higher than the threshold constituted the group with favorable outcome. The sensitivity, specificity, positive predictive value and negative predictive value

Table 1. Causative organisms isolated from the patients.

Organisms	All culture (N)	%	Blood cultures (N)	%
Gram negative bacteria	86	87.8	54	88.6
<i>Escherichia coli</i>	25	25.5	16	26.3
<i>Pseudomonas aeruginosa</i>	24	24.5	17	27.9
<i>Klebsiella</i> spp	13	13.2	10	16.4
Nonfermentative gram negative rod	6	6.1	3	4.9
<i>Enterobacter</i> spp	5	5.1	2	3.3
<i>Salmonella</i> group D	3	3.1	2	3.3
<i>Aeromonas</i> spp	2	2.1	1	1.6
<i>Proteus</i> spp	2	2.1	0	0
<i>Vibrio cholera</i> non O1 non O139	2	2.1	2	3.3
<i>Salmonella</i> group B	1	1.0	1	1.6
<i>Morganella morganii</i>	1	1.0	0	0
<i>Vibrio fischeri</i>	1	1.0	0	0
<i>Moraxella catarrhalis</i>	1	1.0	0	0
Gram positive bacteria	12	12.2	7	11.4
<i>Streptococcus</i> spp	4	4.0	3	4.9
<i>Enterococcus</i> spp	2	2.1	0	0
MSSA	2	2.1	2	3.3
MRSA	1	1.0	0	0
Coagulase Negative Staphylococcus	1	1.0	1	1.6
<i>Corynebacterium</i> spp	1	1.0	0	0
<i>Bacillus</i> spp	1	1.0	1	1.6
Total	98	100	61	100

of the system were computed. The data set in the present study was used to validate the scoring system developed by the Multinational Association for Supportive Care in Cancer Risk Index⁽¹⁶⁾. The sensitivity, specificity, positive predictive value and negative predictive value of both sets were also compared.

RESULTS

The medical records of 433 episodes coded as D70 (agranulocytosis) during the 2 years from January 1999 to December 2000 were identified. 344 episodes met the criteria for febrile neutropenia. 77 episodes were excluded because of inadequate data (56 episodes), concurrent chemotherapy and antimicrobials (14 episodes) and death within 24 hours (7 episodes). Therefore, there were 267 episodes from 220 patients suitable for analysis.

Out of 267 episodes, 98.5 per cent of the cases were hospitalized on medical wards and 1.5 per cent were in the department of Surgery, Obstetrics & Gynecology, Orthopaedic Surgery and Radiation Therapy.

99 patients (45%) were male. Mean age was 44.7 years (SD = 18, range 13-91). 158 patients (71.8%) had hematologic malignancies, of which acute leukemia (101 patients or 45.9%) and lymphoma (42 patients or 19.1%) were the most common underlying diseases. The other 62 patients (28.2%) had solid tumors, 17 patients (7.7%) had breast cancer and 16 patients (7.3%) had sarcoma. 75 patients (28.1%) received growth factors and 6 patients (2.2%) received antibiotic prophylaxis.

The source of infection was unknown in 139 episodes (52.1%) and this group was classified as FUO, whereas, 38 episodes (14.2%) were classified as clinically documented infection, and 90 episodes (33.7%) which had culture proven data were classified as microbiologically documented infection. The common sites of infection of patients with clinically documented infection were lung (42.1%), perineum (21.1%) and soft tissue (18.4%). Most of the patients with microbiologically documented infection were classified as primary bacteremia (55.6%), whereas, urinary tract (17.8%) and soft tissue (10%) were the second and third most common source of infection.

There were 94 clinical specimens taken from patients with 267 episodes that had a positive culture (35.2%). 61 culture-positive specimens (22.8%) were taken from blood. There were 4 episodes that had 2 positive culture specimens. Two episodes had a positive culture with same organisms from pus and blood

specimens, one was *Escherichia coli* and another was *Vibrio cholerae*. *Streptococcus* spp was found in blood and urine from a patient. One patient with osteomyelitis had *Escherichia coli* in pus and group B streptococcus in blood. The other culture-positive specimens were urine (6%), pus (3.7%), sputum (1.5%), stool (0.4%), synovial fluid (0.4%) and urethral swab (0.4%).

98 organisms grew from the clinical specimens as shown in Table 1. Most of the causative organisms were gram negative bacteria that accounted for 86 specimens (87.8%). Gram positive bacteria were found in 12.2 per cent. 8 episodes had polymicrobial infections. Two sets of blood grew two organisms each (*Escherichia coli* & *Klebsiella* spp, and *Aeromonas* spp & *Klebsiella* spp). One patient grew *Streptococcus* spp from blood culture and *Escherichia coli* from pus simultaneously as mentioned previously. Three pus specimens grew dual organisms which were *Escherichia coli* & *Pseudomonas aeruginosa*, nonfermentative gram negative rods & *Pseudomonas aeruginosa*, and *Klebsiella* spp & *Enterococcus* spp. One urethral swab grew *Corynebacterium* spp & *Enterobacter* spp and one urine culture grew *Escherichia coli* & *Enterobacter* spp.

The antimicrobial drugs given to the patients are shown in Table 2. The most commonly used antimicrobial regimen was ceftazidime plus amikacin which was prescribed in 204 episodes (76.4%).

Out of 267 episodes, 159 episodes met the criteria for high-risk or unfavorable outcome and 108 episodes met the criteria for low-risk or favorable

Table 2. Antibiotics given to the patients with febrile neutropenia.

Antibiotic	Frequency of prescription	%
Amikacin	242	44.4
Ceftazidime	239	43.9
Metronidazole	17	3.1
Cefepime	11	2.0
Clindamycin	8	1.5
Cloxacillin	7	1.3
Ceftriaxone	5	0.9
Ciprofloxacin	4	0.7
Imipenem	4	0.7
Netilmicin	3	0.6
Ampicillin	1	0.2
Gentamicin	1	0.2
Ceftriaxone	1	0.2
Amoxicillin/clavulanic	1	0.2
Méropenem	1	0.2

outcome. The mortality rate in 220 neutropenic patients with fever was 17.7 per cent. The cause of death was due to infection in 97.4 per cent. Antimicrobial treatments were modified in 92 episodes (34.5%) because of poor response to treatment. Common complications that occurred during treatment of 267 episodes were hypotension (10.1%), respiratory failure (10.1%), serious bleeding (4.9%) and alteration of consciousness (4.1%).

Of 228 episodes in which patients survived, 17 (7.5%) episodes relapsed, 117 (51.3%) episodes subsided within 5 days and 111 (48.7%) episodes still

had fever for more than 5 days. All of these episodes and the patients who died during treatment were classified as unfavorable outcome.

Potential factors for predicting outcome of febrile neutropenic patients were analyzed by univariate analysis. The factors shown in Table 3 were observed to be statistically significant. Multivariate analysis revealed only 4 independent factors that had a statistically significant association with poorer outcome in the patients as shown in Table 4. They were burden of illness, control of cancer, duration of neutropenia and dehydration.

Table 3. Univariate analysis of potential factors for predicting outcome in febrile neutropenic patients.

Factor	Outcome				P
	Unfavorable N = 159	%	Favorable N = 108	%	
Male	83	52.2	36	35.2	0.009
Mean age (SD), year	44.7 (16.7)		45.0 (19.2)		0.875
Underlying diseases					
Acute leukemia	95	59.7	41	38.0	<0.001
Chronic leukemia	5	3.1	3	2.8	
Myeloma	5	3.1	1	0.9	
Lymphoma	26	16.4	21	19.4	
Other hematologic malignancies	0	0	1	0.9	
Breast cancer	10	6.3	8	7.4	
Lung cancer	4	2.5	5	4.6	
Sarcoma	1	0.6	17	15.7	
Other solid tumors	13	8.2	11	10.2	
Uncontrolled cancer	143	89.9	48	44.9	<0.001
Number of courses of chemotherapy, median (interquartile range)	3 (3)		3 (3)		
Number of regimens of chemotherapy, median (interquartile range)	2 (1)		2 (1)		
Burden of illness					
No or mild	19	11.9	79	69.4	<0.001
Moderate	85	53.5	31	28.7	
Severe	55	34.6	2	1.9	
ECOG performance status					
0	0	0	1	0.9	<0.001
1	21	13.2	68	63	
2	52	32.7	29	26.9	
3	43	27.0	9	8.3	
4	43	27.0	1	0.9	
Use of growth factor	42	26.4	33	30.6	0.348
Use of antibiotic prophylaxis	6	3.8	0	0	0.084
Mean duration from first day of last course of chemotherapy (SD), days	11.5 (13.7)		7.6 (6.6)		0.017
Mean duration of neutropenia (SD), days	11 (6.3)		8.3 (4.6)		<0.001
Onset of fever at presentation					
≤ 24 h	87	54.7	36	33.3	0.006
> 24-48 h	32	20.1	28	25.9	
> 48-72 h	19	11.9	23	21.3	
> 72 h	21	13.2	21	19.4	
Occurrence of fever in hospital	82	51.6	34	31.5	0.002
Temperature ≥ 39°C	83	52.2	48	44.4	0.263
Systolic blood pressure < 90 mmHg	17	10.7	1	0.9	0.004

Table 3. Univariate analysis of potential factors for predicting outcome in febrile neutropenic patients (Continue).

Factors	Outcome				P
	Unfavorable N = 159	%	Favorable N = 106	%	
Diastolic blood pressure < 60 mmHg	21	13.2	1	0.9	0.001
Pulse rate ≥ 120/min	66	41.5	27	25	0.008
Respiratory rate > 20/min	58	36.5	21	19.4	0.004
Significant blood loss	58	36.5	9	8.3	< 0.002
Respiratory failure	10	6.3	0	0	0.007
Altered mental state	27	17.0	5	4.6	0.004
Mucositis	57	36.1	16	14.8	< 0.001
Superficial fungal infection	44	27.8	16	14.8	0.019
Diarrhea	46	28.9	12	11.1	0.001
Abdominal pain	28	17.6	7	6.5	0.014
Nausea/vomiting	29	18.2	13	12.0	0.232
Diarrhea	46	28.9	12	11.1	0.001
Central intravenous catheter insertion	8	5.0	1	0.9	0.088
Dehydration	66	41.5	7	6.5	0.001
Spinal cord compression	3	1.9	0	0	0.275
Underlying heart diseases	2	1.3	0	0	0.516
Underlying pulmonary diseases	1	0.6	3	2.8	0.307
Diabetes mellitus	10	6.3	6	5.6	1
Surgery within 6 weeks	7	4.4	5	4.6	1
Previous febrile neutropenia	73	47.7	25	23.6	< 0.001
Previous fungal infection	1	0.6	5	4.7	0.042
Antifungal treatment within 6 months	12	7.7	6	5.6	0.668
Antibiotic treatment within 7 days	36	22.6	13	12.0	0.042
Co-morbid diseases	7	4.4	3	2.8	0.774
Hemoglobin < 8 g/dl	79	49.7	42	38.9	0.107
Median leucocytes (interquartile range), / μ l	600 (630)		750 (662.5)		0.037
Median absolute neutrophils (interquartile range), / μ l	92 (227)		145 (272.5)		0.057
Median absolute monocytes (interquartile range), / μ l	34 (71)		65.5 (109.5)		< 0.001
Median absolute polymorphonuclear leukocytes (interquartile range), / μ l	202 (336)		289 (377.5)		0.005
Median platelets (interquartile range), / μ l	32,000 (58,000)		68,500 (111,500)		< 0.001
Blood Urea Nitrogen ≥ 20 mg/dl	43	27.2	13	12.5	0.007
Creatinine ≥ 2 mg/dl	6	3.8	6	5.7	0.351
Sodium ≥ 150 mmol/L	1	0.6	0	0	1
Potassium < 3.5 mmol/L	68	43.3	38	36.9	0.368
Bicarbonate < 24 mmol/L	77	49.0	57	55.3	0.386
Alanine Transaminase ≥ 74 U/L	28	21.9	5	7.6	0.021
Aspartate Transaminase ≥ 80 U/L	30	23.4	101	5.2	0.244
Alkaline phosphatase ≥ 117 U/L	56	43.8	20	31.7	0.151
Bilirubin ≥ 2 mg/dl	29	22.8	4	6.5	0.010
Albumin < 2.5 mg/dl	25	18.0	6	8.7	0.118
Globulin ≥ 3.5 mg/dl	45	33.8	15	23.8	0.209
Abnormal chest radiograph	115	72.8	90	84.9	0.030
Classification of fever					
Fever of unknown origin	68	42.8	71	65.7	0.001
Clinically documented infection	26	16.4	14	13.0	
Microbiologically documented infection	63	40.9	23	21.3	
Antimicrobial susceptibility	56	90.4	21	95.5	0.632

The MASCC scoring system was used to validate this set of data and examine the trade-offs between sensitivity, specificity, positive and negative predictive values (16). When using the threshold scores

of 21 and 22, the sensitivity, specificity, positive predictive value and negative predictive value was 88.8 per cent and 78.5 per cent, 45.5 per cent and 75 per cent, 52.8 per cent and 68.3 per cent, and 85.5 per

Table 4. Factors associated with the outcomes from the multivariate analysis.

Factors	OR (95% CI)	P
Burden of illness : moderate	3.94 (1.78, 8.73)	0.001
Burden of illness : severe	18.59 (3.55, 97.49)	0.001
Controlled cancer	0.21 (0.09, 0.50)	<0.001
Duration of neutropenia for 1 additional day	1.17 (1.08, 1.26)	<0.001
No dehydration	0.17 (0.05, 0.35)	0.003

Table 5. The scoring system developed from local data.

Characteristic	Weight
Burden of illness : no or mild symptoms	8
Burden of illness : moderate symptoms	4
Controlled cancer	5
Expected time of neutropenia (day) : 0-3	8
Expected time of neutropenia (day) : 4-10	4
Expected time of neutropenia (day) : 11-15	2
No dehydration	5

cent and 83.6 per cent respectively. A scoring system was also developed from this data set in order to identify the low-risk subgroup. The factors that were statistically significant in the multivariate model were used to create the scoring system as shown in Table 5. Then the sensitivity, specificity, positive and negative predictive values of this scoring system were also examined as shown in Table 6.

The MASCC scoring system was compared to the scoring system developed from this data set as determined by the area under the Receiver Operating Characteristic (ROC) curves as shown in Fig. 1. The scoring system locally developed had an area under the curve of 0.908 (95% CI 0.870-0.945), whereas, that of the MASCC scoring system was 0.803 (95% CI 0.748-0.858).

DISCUSSION

Although previous studies have demonstrated a shift of pathogenic bacteria in febrile neutropenic patients from gram negative organisms to gram positive organisms, the data observed in the present study did not show that shift. Gram negative bacteria remained the core organisms and were isolated in 87.8 per cent of microbiologically documented infections in febrile neutropenic patients in Siriraj Hos-

pital. Prior sets of data from Siriraj Hospital and the Royal Army Hospital, Thailand, also failed to demonstrate a shift from gram negative to gram positive bacteria (12,27). The increased use of central intravenous catheters may be responsible for the increase in gram positive pathogens found in Western countries. Only 9 patients in the present study had a central intravenous catheter in place.

In 267 episodes of febrile neutropenia, 61 episodes had a positive blood culture (22.8%) and 50 episodes of these were classified as primary bacteremia. This observation did not differ from the previous study in the same hospital which reported bacteremia in 22 per cent (12). Other studies have also reported bacteremia in febrile neutropenic patients ranging from 22 per cent to 32 per cent (5,7-12). Among gram negative bacteria, *Escherichia coli* and *Pseudomonas aeruginosa* were the most common causative organisms in both bacteremia and overall infections, followed by *Klebsiella pneumoniae*. Most organisms were susceptible to antimicrobials prescribed by the physicians. The most common antimicrobials prescribed for treating febrile neutropenic patients were ceftazidime and amikacin which were active to all isolates of gram negative bacteria. So, the extended-spectrum beta-lactamase (ESBL) producing organism was not the main problem. Only 7 episodes (11.4%) found gram positive bacteria in blood cultures. *Streptococcus* spp and methicillin-sensitive *Staphylococcus aureus* (MSSA) were the most common causes of gram positive bacteremia in 3 and 2 episodes respectively. Thus, the most appropriate antimicrobials for treating febrile neutropenia should cover mainly gram negative bacteria including *Pseudomonas aeruginosa*. Although there is controversy concerning the use of vancomycin for the initial treatment in febrile neutropenic patients, the data from the present study indicated that vancomycin is not necessary for initial

Table 6. Clinical prediction performance of the locally developed scoring system.

Score	Sensitivity	Specificity	PPV*	NPV**
12	91.6	64.3	65.8	91.1
13	82.2	81.8	77.2	86.0
14	81.3	83.9	79.1	83.7
15	76.6	89.5	84.5	83.7
16	76.6	90.2	85.4	83.8
17	60.7	95.8	91.5	76.5

* PPV = Positive Predictive Value

** NPV = Negative Predictive Value

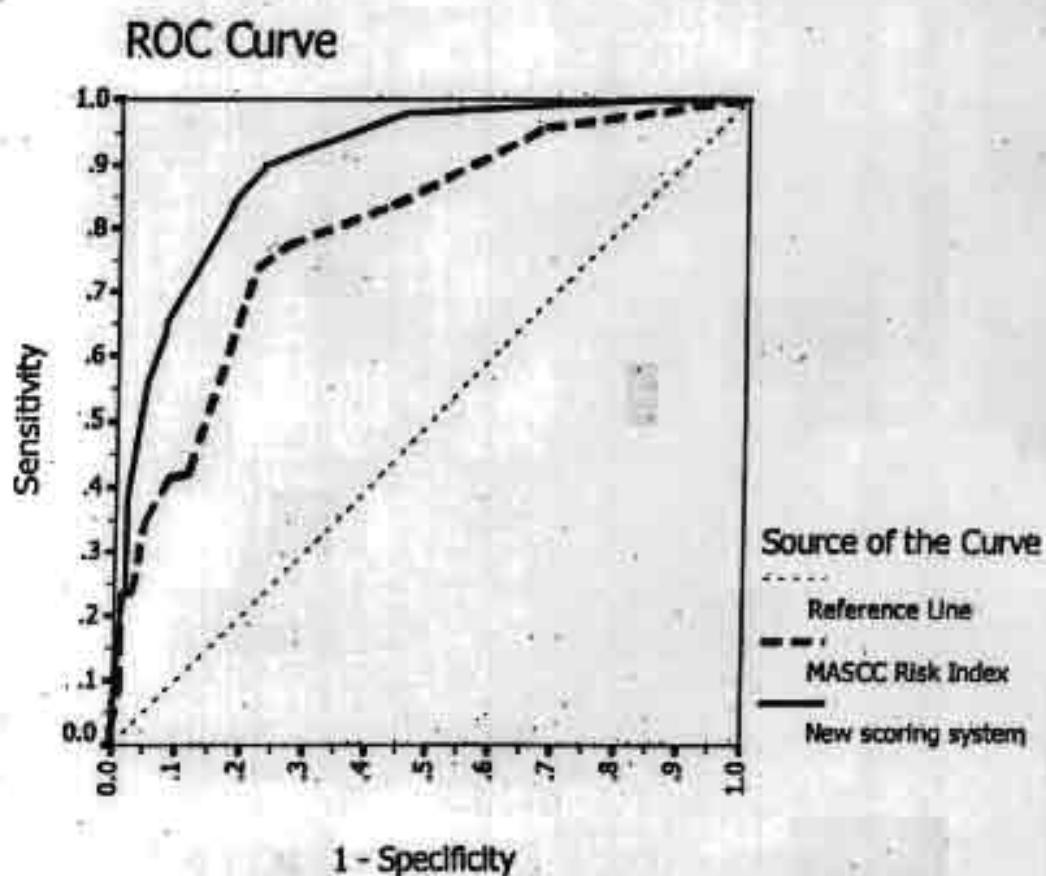


Fig. 1. Receiver Operating Characteristic (ROC) curves for the MASCC Scoring System and the locally developed scoring system using local data.

empirical treatment but it could be considered in some specific patients with an increased risk for acquiring methicillin-resistant *Staphylococcus aureus* (MRSA)(28).

Appropriate treatments may vary for febrile neutropenic patients who are at substantially different risk. There is general acceptance that febrile neutropenic patients comprise a heterogeneous popu-

lation. The identification of these low-risk patients has led to changes in treatment regimens, including changes in antimicrobial therapy, mode of antibiotic administration and treatment setting. Several clinical trials have demonstrated the safety and efficacy of oral antibiotics for low-risk patients (24-26). Talcott et al demonstrated the factors defining the high-risk subgroup include in-patient status, or outpatient status with serious concurrent co-morbidity or patients with uncontrolled cancer (15). By using the scoring system, Klastersky et al demonstrated that weighting of the potential risk factors led to more precise identification of a low-risk subgroup. With a threshold score of 21, the prediction had sensitivity of 71 per cent, specificity of 68 per cent, positive predictive value of 99 per cent and negative predictive value of 36 per cent for patients with favorable outcome or low-risk subgroups (16).

Despite many studies which have demonstrated the ability of the scoring system to differentiate low-risk subgroup patients and have led to the development of new guidelines (29), data from developing countries with different epidemiological and socioeconomic backgrounds is lacking. The MASCC scoring system was used to validate this data set and the authors found that for a threshold score of 21, the sensitivity, specificity, positive predictive value and negative predictive value was 88.8 per cent, 45.5 per cent, 52.8 per cent and 85.5 per cent respectively. When using a threshold score of 22, the specificity became higher (75%). Therefore, if the MASCC scoring system is to be used in Thai patients, the threshold score of 22 is more accurate in predicting the outcome.

A scoring system to identify the low-risk subgroup was developed using the data from Thai patients. It was found that a threshold score of 16 had a low misclassification rate with a sensitivity of 76.6 per cent, specificity of 90.2 per cent, positive predic-

tive value of 85.5 per cent and negative predictive value of 83.8 per cent in predicting a favorable outcome. Looking at the ROC curve, the locally developed scoring system had an area under the curve greater than that of the MASCC scoring system and, is therefore, more accurate in predicting patient outcome.

Among the factors expected to be predictors for unfavorable outcome (underlying diseases, duration of neutropenia and co-morbidity), only the duration of neutropenia was included in the model. Underlying disease was shown to be statistically significant in the univariate analysis but was not in the multivariate model. This was due to the fact that patients with hematologic malignancies usually had a longer duration of neutropenia because of poor bone marrow recovery. Thus, duration of neutropenia was an independent risk factor for predicting patient outcome. Co-morbidity did not show a significant difference between the groups because of the small number of patients.

In conclusion, this retrospective study revealed that the epidemiology of causative organism in febrile neutropenic patients is different from Western countries. A locally developed scoring system with a threshold score of 16 can identify a low-risk subgroup accurately. However, the locally developed scoring system needs to be validated on another set of data collected during different periods and the data prospectively collected before it can be adopted for use in clinical practice.

ACKNOWLEDGEMENT

The authors wish to thank Dr. Yingyong Chinthammitr for his kind suggestions and Mr. Suthipol Udompuntharak for his help with statistical analysis. Dr. Visanu Thamlikitkul is a recipient of Senior Researcher Scholar of the Thailand Research Fund.

(Received for publication on September 6, 2002)

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พัฒนาปัจจัยเสี่ยงของการเกิดภาวะแทรกซ้อนและการพยากรณ์โรคในผู้ป่วยไทยที่มีเนื้องอกขาวในเดือนต่อเดือน

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บทนำ : แนวทางการรักษาผู้ป่วยที่มีเนื้องอกขาวในเดือนต่อเดือนที่ใช้ตั้งแต่เดือนกันยายนเป็นปัจจุบัน การศึกษาในทางประโภคพบริเวณน้ำดีวิทยาของไทยก่อให้เกิดปัจจัยทางเชื้อแบคทีเรียก่อภัยเป็นเชื้อแบคทีเรียก่อภัย แต่สูงป่วยสูงที่สุดและมากที่สุดที่ก่อภัยและมีการพยากรณ์โรคที่หลากหลายยังมีการศึกษาเป็นจังหวัดที่ห่วงโซ่ในการทำงานและการพยากรณ์โรค แต่ยังไม่เคยมีการศึกษาที่เป็นจังหวัดในคนไทย

วัตถุประสงค์ : เพื่อศึกษาขนาดวิทยาของเชื้อแบคทีเรียก่อโรคและปัจจัยที่ช่วยท่านางการพยากรณ์โรคในผู้ป่วยไทยที่มีเนื้องอกขาวในเดือนต่อเดือน

วิธีการศึกษา : เก็บตัวอย่างที่เก็บตัวอย่างจากน้ำดีของผู้ป่วยที่รับให้รักษาในโรงพยาบาลศิริราชที่ได้รับการรักษาต่อเนื่อง

ผลการศึกษา : ผู้ป่วย 220 คนมีปัจจัยเดือนต่อเดือนที่บ่งบอกและมีใช้จำนวน 267 ครั้ง โดยเป็นผู้ป่วยไข้คอมบะริส์ที่เดือนต่อเดือน 71.8 และผู้ป่วยไข้คอมบะริส์ที่เดือนต่อเดือน 28.2, มีการศึกษาในระยะเดือนต่อเดือน 22.8 โดยพบบีบีแบคทีเรียก่อภัยเดือนต่อเดือน 88.6, อัตราต่อเดือนต่อเดือน 17.7 และปัจจัยที่มีผลต่อการพยากรณ์โรคได้แก่ ความรุนแรงของการรักษา, การพยากรณ์ทางการรักษาที่ว่องไว, รวมถึงการนับเม็ดเลือดขาวที่และภาวะชาตื้น ระบบคะแนนที่สร้างขึ้นโดยใช้เกณฑ์และค่าที่ 16 คะแนนสำหรับตัวบีบีแบคทีเรียก่อภัยที่มีการพยากรณ์ไข้เดือนต่อเดือน โดยมีความจำเป็นต่อเดือนต่อเดือน 90.2, ความไวต่อเดือนต่อเดือน 78.6 และคุณภาพการพยากรณ์ (positive predictive value) ร้อยละ 85.4

สรุป : สำหรับประเทศไทยในผู้ป่วยไทยที่มีเนื้องอกขาวในเดือนต่อเดือน ผู้คนมีปัจจัยเดือนต่อเดือนที่เดือนต่อเดือน 88.6, อัตราต่อเดือนต่อเดือน 17.7 และปัจจัยที่มีผลต่อการพยากรณ์โรคได้แก่ ความรุนแรงของการรักษา, การพยากรณ์ทางการรักษาที่ว่องไว, รวมถึงการนับเม็ดเลือดขาวที่และภาวะชาตื้น ระบบคะแนนที่สร้างขึ้นโดยใช้เกณฑ์และค่าที่ 16 คะแนนสำหรับตัวบีบีแบคทีเรียก่อภัยที่มีการพยากรณ์ไข้เดือนต่อเดือน โดยมีความจำเป็นต่อเดือนต่อเดือน 90.2, ความไวต่อเดือนต่อเดือน 78.6 และคุณภาพการพยากรณ์ (positive predictive value) ร้อยละ 85.4

คำสำคัญ : ระบบการนับเม็ดเลือดขาว, เนื้องอกขาวในเดือนต่อเดือน, ไข้, พยากรณ์โรค

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Breastfeeding and Its Relation to Child Nutrition in Rural Chiang Mai, Thailand

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Abstract

A cross-sectional study was conducted to evaluate current breastfeeding practices among a population in a remote rural area of Chiang Mai, Thailand. Three hundred and ninety-five women with children aged less than 36 months were studied. Mothers were interviewed and anthropometric status of children was assessed. Seventy per cent of them were from a hill-tribe ethnic group and 30 per cent were Thai. The results showed that breastfeeding was highly prevalent amongst the hill-tribe population especially in uneducated multiparous women. Only 53.6 per cent of children were exclusively breastfed in the first six months of life. Breastfeeding tended to be continued until or beyond the age of one year but complemented with other foods. For children aged up to 6 months, the prevalence of undernutrition, wasting and stunting in the exclusively breastfed group was 0.0 per cent, 1.9 per cent and 7.7 per cent, respectively, compared to 2.1 per cent, 4.3 per cent and 8.5 per cent, respectively in partial/non-breastfed children ($p > 0.05$). For children aged between 7-12 months, the undernutrition, wasting, and stunting in the exclusively breastfed group was 23.1 per cent, 15.4 per cent and 7.7 per cent, respectively, compared to 13.4 per cent, 7.3 per cent and 9.8 per cent, respectively in partial/non-breastfed children ($p > 0.05$). For children older than one year ($n = 201$), 12 were exclusively breastfed and six of them were undernourished. In the partial/non-breastfed group, 70 of 189 were undernourished ($p > 0.05$). The results showed that children were more likely to be malnourished as age increases in either exclusively breastfed or partial/non-breastfed group. This may not be a breastfeeding issue but the weaning practices. Appropriate food supplementation and correct weaning practices are essential in order to maintain nutritional status in children beyond six months of age.

Key word : Breastfeeding, Child Nutrition, Ethnic Groups

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J Med Assoc Thai 2003; 86: 415-419

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