Commentaries

Cambodian Disaster Relief: Refugee Camp Medical Care

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Abstract: The lack of available data impedes the efficient delivery of health care in disaster situations. We present organizational information and patient data based on a review of 924 consecutive admissions seen during our three-month experience as refugee camp pediatricians at Khao-I-Dang Holding Center for Kampucheans in Thailand. Most patients had severe and multiple common diseases, with pneumonia, diarrhea, measles, and meningitis having the highest incidence. To optimize care, the gathering and distribution of epidemiologic data, the development of laboratory facilities and treatment protocols, standardization of supplies, and the initiation of programs for disease prevention must be stressed. *Am J Public Health* 1982; 72:589–594.)

Introduction

Several times a year major disasters exceed the adjustment capacity of the involved community and require international aid.[1] It has been shown that the planning, implementation and evaluation of relief efforts and their consequences are amenable to study;[2–6] yet, such efforts have been handicapped by a lack of data.[7–10] Given the limitations inherent in disaster health care, it is important to obtain more data to maximize efficiency. Based on three months experience as hospital physicians at the Khao-I-Dang Holding Center for Kampucheans, we describe the health care delivery system with an emphasis on the hospital ward, review 924 consecutive admissions and suggest various approaches for future disasters.

Methods and Materials

Health Services and Organization

The delivery of health services at the Khao-I-Dang Center was coordinated by the International Committee of the Red Cross (ICRC) and provided by various independent voluntary agencies. These areas of service included nutrition, child and maternal health, epidemiology, outpatient clinics, hospital, pharmacy, and morgue.

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This report is based on data gathered from hospital Ward 9, one of three acute care pediatrics wards in the 1,000-bed field hospital. Due to lack of guidelines, each ward evolved its own standard of practice. Ward 9, sponsored by the International Rescue Committee, was organized as follows:

- *Building*—The 85-bed ward was a separate bamboo building. The ward staff initiated, designed and contracted for additional construction as needed. Areas were established for supplemental food preparation, intensive care nursery, admissions corner, measles isolation, laundry, staff room, and a nursing station.
- *Sanitation—Outside:* latrines, trash removal, and insect control were provided. *Inside:* each ward was responsible for its own sanitation.
- *Medical Records*—Ward admission log and problem-oriented bedside chart were required. Although not required, data were also kept for epidemiologic surveillance and ward studies.
- *Feeding*—Regular feedings were coordinated with the central hospital kitchen, a staff feeding program was developed, and supplemental feedings were prepared according to prescription (oral electrolytes, lactose and non-lactose based milk dilutions, high protein cereal, freshly expressed breast milk from Khmer women for neonatal orphans).
- *Staffing and Training*—A rotating staff of doctors, nurses, and paramedics volunteered for 1–12 months. Doctor and nurse roles were often interchanged. Minimal ward coverage was two to three doctors and three to five nurses during the day and two nurses at night. Additional Khmer workers were trained as translators, nurses, and general ward staff. At any given time, 10–20 per cent of the volunteer staff was absent due to illness.

TABLE 1—Distribution of 924 Patients by Age and Sex

Age	Sex		Total Number	%
	M	F		
1 month	14	27	41	4.5
2–5 mos.	63	50	113	12.0
6–11 mos.	56	38	94	10.0
1–4 yrs.	180	138	318	34.5
2 yrs.			86	
3 yrs.			60	
4 yrs.			90	
5–9 yrs.	133	95	228	25.0
10–14 hrs.	62	58	120	13.0
15–19 yrs.	5	5	10	1.0
TOTALS	513	411	924	100.0

- *Supplies*—Individual volunteers and the ward sponsor supplemented medical and general ward supplies provided from the central Red Cross warehouse and pharmacy. These were obtained, inventoried, and stored on a regular basis.
- *Patient Care*—Patients were referred directly from the admissions center or from an outpatient clinic via the admissions center. They were distributed among the three pediatric wards in order, depending on bed availability. Although all screening facilities were often overworked and overcrowded, these factors did not influence ward admissions. Shortage of beds required rigorous control: the lack of adequate staffing led to patients being turned away until the next day rather than to too many admissions. Once in Ward 9 the patients were rescreened and distributed according to age (neonates, infants, older children), level of care needed (acute, intensive), and the need for isolation. Treatment protocols were developed and updated continuously. Discharged patients returned to the ward daily or as needed to finish treatments.

Unless an orphan, the patient was accompanied by at least one parent, if not the entire family. All of the family slept together on the same or adjacent platforms. The mother played an integral part in the health care delivery, particularly in the areas of rehydration with continuous oral feedings, hygiene, and comfort. Without them, the staffing shortage would have been intolerable. Significant nursing time was devoted to teaching parents to identify problems and to feed the children adequately balanced diets. The care of orphans from both a medical and psychological standpoint was only possible because of the large number of volunteer surrogate mothers who "adopted" these children, often to replace their own recently dead offsprings. Although as deeply hurt by the death of their loved ones as any mother, they were a seemingly never-tiring source of support.

Diagnoses and Treatments

Patient Population—The camp population rose from 4,800 on the first day, November 21, 1979, to 40,000 by December 1, and leveled off at 117,000 by mid-January.[11] Thirty-nine per cent were children under the age of 15. Between December 1 and February 27, there were 924 admissions to Ward 9. The average daily census was 70, and the average number of daily admissions was 11 (range 3–21). The average length of stay was seven days (range seven hours to eight weeks). Admissions were heavily weighted to infants and young children. For example, only 8 per cent of the camp's children were under the age of one year but they accounted for 27 percent of our admissions (Table 1).

Conditions Seen—Of the 924 patients, 20 had no diagnosis recorded. A single diagnosis was recorded in 286 patients, and the rest had two or more. In most cases, the diagnosis was clinical or descriptive because the lack of laboratory facilities precluded confirmation. Histories had to be obtained via Khmer translators of varying ability. The overwhelming majority of diagnoses were infectious, classified by the site of infection, as etiologic agents could not be identified. For example, a history of productive cough, fever, chills, and the presence of rales on the physical examination was classified as pneumonia; whereas, the absence of rales led to the diagnosis of bronchitis. There was no camp-wide standardization of diagnostic criteria for any disease entity.

The admissions were analyzed for distribution according to both primary and secondary diagnoses (Table 2). Most patients were seriously ill. The only cases of malnutrition admitted to this ward were complicated by another disease which was considered the primary diagnosis. Overall, 51 per cent of patients had respiratory illnesses, 32 per cent diarrhea, 21 per cent malnutrition, 18 per cent measles, 17 per cent otitis, 10 per cent neurological (usually meningitis and/or seizures), 8 per cent anemia, 5 per cent malaria, and 5 per cent skin diseases.

Pneumonia, the most frequent respiratory diagnosis, occurred in 297 patients and was the primary diagnosis in 153. All were treated with antibiotics, with the older children starting on penicillin and the younger on ampicillin or amoxicillin. If they continued febrile for more than four days, other antibiotics were added. Fifteen per cent of cases had a superimposed respiratory complication that required additional therapy. This was usually bronchospasm, but empyema, pleural effusions, and respiratory failure also

TABLE 2—Distribution of Diagnoses

Diagnoses	Primary % (Distribution (N = 904)	Total % Distribution (N = 904)
Respiratory	29.8	50.7
Pneumonia	(16.9)	
Bronchitis	(5.7)	
URI	(5.2)	
Other	(1.8)	
Respiratory/Diarrhea	10.8	
Diarrhea	13.9	32.1
Malnutrition	—	21.1
Measles	17.8	17.8
Acute	(12.2)	
Post	(5.6)	
Neurological	7.2	10.0
Meningitis	(5.1)	
Other	(2.1)	
Otitis	3.9	17.4
Parasites	—	9.4
Skin	3.2	4.6
Malaria	3.1	4.9
Surgical/Trauma	2.1	2.9
Anemia	1.7	8.1
Tuberculosis	1.0	1.0
Genitourinary	0.8	1.5
Sepsis	0.8	
Eye	0.6	3.3
Other	3.3	

occurred. The persistent lack of adequate amounts of oxygen precluded its use as supportive therapy. Clinically, this contributed to some of the pneumonia and post-measles pneumonia deaths.

Severe diarrhea requiring initial parenteral rehydration, occurred in 290 patients and was the primary diagnosis in 124. Bloody diarrhea occurred in 21 per cent of cases and was seen in 50 per cent of the cases of acute measles with diarrhea. Without the aid of a laboratory, we arbitrarily elected to treat all cases of bloody diarrhea as amebiasis. This was discussed with the local Thai physicians. Initial therapy of this group was with metronidazole, a drug we had in plentiful supply. If no response was seen in three days, ampicillin and/or sulfatrimethoprim were added as needed to cover presumed bacterial pathogens. Sulfatrimethoprim was the drug of choice in cases of non-bloody diarrhea. Rehydration was deemed so important that one person was placed in charge of "supplemental feeding" in our ward. Once oral fluids could be tolerated, this person defined a type and amount of fluid* for each patient and followed the child (as did the "regular" doctor and nurse) until a normal diet was resumed. This was not standard camp practice and was initiated by our group.

Intestinal parasites were diagnosed in 85 cases by history, gross examination, and later, microscopic examination of stool. One case of ascaris liver infestation was diagnosed after a laparotomy was done during a 10-week admission for fever. The lack of widespread stool examination obviously underestimated the problem of parasitosis. All patients received a broad-spectrum antihelminthic upon admission.

There were 40 cases of malaria and four cases of cerebral malaria. Fever with no obvious source in a patient with splenomegaly was presumed to be malaria. However, splenomegaly with negative smears and positive smears without splenomegaly were also seen The youngest case was a 20-day-old infant with Plasmodium Vivax. The cyclical fever patterns were very rarely seen. No cases of blackwater fever were seen, but seizures and coagulopathy were noted. Falciparum malaria was treated with a single dose of Fansidar (pyrimethamine and sulfaoxine) and/or quinine for 10 days. Vivax malaria was treated with chloroquine and/or quinine. In cases without laboratory confirmation of type, Fansidar and quinine were used. Cerebral malaria was treated with intravenous quinine until the patient was able to take oral medications. These treatment protocols were developed by our group. Subsequently, the camp as a whole, in conjunction with representatives of the ICRC and the Center for Disease Control, developed standardized guidelines, which happened to concur with ours. Although malaria accounted for only 5 per cent of the total admissions, it caused considerable morbidity, required a 10-day hospitalization, and caused significant diagnostic difficulty.

A measles epidemic accounted for 110 cases of acute measle and 51 cases of post-measles complications. The male/female ratio in the acute cases was 1.04:1 (56/54), while in the post-measles group, it was 2.13:1 (34/16). We know of no data in the literature to explain this finding. The major complications in each group were pneumonia (55 per cent of acute cases and 69 per cent of post-measles cases), diarrhea (39 per cent, 39 per cent), malnutrition (32 per cent, 48 per cent), otitis (22 per cent, 29 per cent) and deaths (0.9 per cent, 18 per cent). The 10 measles deaths represented 23 per cent of the total deaths. Post-measles complications were seen in a younger and more malnourished group. A program to vaccinate all children under the age of 5 years was incompletely implemented and resulted in the vaccination of only a few thousand children. In addition, 19 per cent (30/161) of admitted patients with measles were over age 5 and thus not even in the targeted group. It is not known what per cent of vaccinated patients developed measles.

Of the 116 cases with malnutrition, 47 were diagnosed clinically prior to the use of standard tables of weight for height. No attempt was made to differentiate kwashiorkor from marasmus. The clinical parameters used included obvious growth failure and muscle wasting, the presence of ascites and leg edema, reddish-brown discoloration of the hair, marked protuberance of the abdomen with severe muscle wasting, and patchy skin discoloration. The clinical criteria were felt to be specific but not sensitive. Of the 69 patients found to be below the 80th percentile of weight for height (the lower limit of normal),[12] only 39 were diagnosed clinically using the above clinical criteria. Although there was no difference in short-term mortality between the group diagnosed clinically and that from the anthropometric tables, there are no data on the long-term outcome.

*Oral electrolytes and then graduating to rice water, soy formula when available, non-lactose and finally lactose milk.

TABLE 3—Distribution of Deaths by Cause

Cause	Number
Measles	10
acute	(1)
post-measles	(9)
Malnutrition	8
Pneumonia	5
Diarrhea	5
Neonatal Deaths	5
Meningitis	3
Seizure	2
Bleeding Disorder	2
Malaria	1
Cleft Lip/Palate	1
Peritonitis	1
TOTAL	43

There were 43 deaths (4.7 per cent) as shown in Table 3. Malnutrition was the primary cause in 19 per cent, but it was also present in 50 per cent of the measles' deaths. Thirty-one of the deaths occurred within three days of admission, indicating the severity of the illnesses at the time of admission.

Meningitis was diagnosed by gross visualization of spinal fluid for purulence prior to the availability of laboratory facilities. All were initially treated with intravenous ampicillin and chloramphenicol. Until the use of Gram stains, some patients with normal gross spinal fluids were treated if they had fever, headache, and a stiff neck. With the advent of Gram stains, therapy was tailored depending on the organism noted.

Otitis was treated with either ampicillin or sulfa/trimethoprim. One death from generalized purpura, bleeding, and shock did occur five hours after the institution of ampicillin therapy for what seemed a routine case of otitis.

No specific data were available on the etiology of the anemias. Most patients probably had lower hematocrits than normal, but because of limited laboratory facilities, only those with truly white conjunctivae had hematocrits done. Transfusions were given only to symptomatic children with hematocrits below 10 per cent. Although all blood was typed, at first it was not cross-matched. One unit of blood would be shared sequentially among several children. At times blood was drawn from the volunteers and injected directly into the patients.

Skin infections were treated with penicillin. Anti-penicillinase antibiotics were available in extremely short supply because some members of our group had brought them. There was no clinical evidence that their use favorably affected the disease course and, in this setting, there was little theoretical reason to expect that they would be necessary. They were usually used in settings when other therapies had failed.

Tuberculosis was initially suggested in patients with a classical x-ray picture that had not responded to broad-spectrum antibiotic therapy. Subsequently acid-fast stains of sputum were done, but the establishment of this test was for some reason extremely difficult and took months before it was available. Therapy was attempted in the pediatric population with isoniazid. Despite manufacturer's warnings about its use in children under the age of 13, ethambutol was occasionally used. Rifampin was unavailable.

Discussion

Previous reports have stressed the need for rapid collection and analysis of medical information to facilitate health planning and delivery in disaster situations.[2-5] Medical problems for a stated type of disaster in a specific area are predictable, and much information is already available. In our experience the majority of the initial personnel were inadequately trained and unfamiliar with the delivery of health care in disaster situations. However, much can be done to maximize efficiency in spite of the limitations of time, staffing, and supply.

Initial efforts were hampered by the lack of communication among the various agencies. With each ward administered by a separate voluntary agency, the lack of strong central leadership contributed to the inability to set standards of practice. The problems were compounded by poor volunteer screening and assignment, which found a psychiatrist providing intensive care feeding and gynecologists adult medical care. During our stay, one of us initiated "grand rounds" for all physicians. This increased the level of cooperation and led to the formation of treatment protocols and a sharing of epidemiologic information. It also helped alleviate situations where patients were diagnosed with diseases such as kala-azar, not found in that area, and tetanus, when the patient simply had a dislocated jaw. In the future, a formal mechanism to identify and solve problems needs to be an early priority in hospital organization. The developing nature of the system and the rotating nature of the staff requires that previous information and ongoing data be available at all times. A strong central administration is needed to implement these principles.

In terms of patient care, there were several major problem areas: epidemiologic information, laboratory facilities, treatment protocols and supplies, and disease prevention. Background data from previous disasters were unavailable. For the present disaster, there were inadequate epidemiologic data except for malaria. Important questions, such as what percentage of patients with fever and splenomegaly or simply fever without a source had malaria, were not addressed. Simple questions, such as what percentage of patients with diarrhea with or without blood had amebiasis, were not addressed. A comprehensive list of diagnoses and their frequencies must be generated early to provide orientation to the type and extent of illnesses to be seen. These data would also permit ascertaining whether given empiric therapeutic strategies for a given symptom complex were successful. Only through camp-wide compilation of such data could meaningful numbers be obtained. Such guidelines would be extraordinarily useful prior to the availability of specific laboratory-confirmed diagnoses.

Perhaps one of the most critical problems in patient care outside of public health considerations was the lack of

laboratory facilities. With health care delivery fragmented among the various voluntary agencies, no one chose to "adopt" the laboratory until six weeks after the hospital was built. Even then only hematocrits, urinanalyses, stools for ova and parasites, and smears for malaria, gram stain, and tuberculosis were available. The availability of bacterial cultures could have eliminated the use of multiple and/or broad-spectrum antibiotics in treating most infections. Establishing a simple laboratory should be an early priority in future efforts, both in order to treat the patients on hand and to generate necessary epidemiologic data. Without a reasonably accurate diagnosis, treatment was based on probability and empiricism. The inability to make diagnoses with certainty severely retarded standardizing diagnostic criteria for any given disease.

Adequate treatment protocols were generally unavailable, and diseases were treated without benefit of earlier experience. This was especially true in the care and treatment of the severely malnourished. For example, patients with malaria and malnutrition were initially treated with the standard doses of quinine but developed severe tinnitus, nausea, and vomiting until the doses were decreased empirically. Even in such basic areas as refeeding, the standard texts suggested using milk, which universally caused severe diarrhea. Details of short-course therapy for tuberculosis were not available. Most adults with tuberculosis were not treated throughout the time covered in this report, pending the development of a public health strategy to care for the many thousands of patients presumed to be affected. This kind of information should have been made readily available by those in charge. Leprosy was also not treated pending the arrival of a team of specialists that had been requested. This group did not arrive until four months after the camp opened. Initial treatment should have been undertaken prior to their arrival.

An additional problem in treatment was in the area of drugs and medical supplies. The efficient provision of supplies during a disaster relief operation has been studied.[3] Model lists of essential drugs have been established; yet, the lack of coordination and standardization of supplies provided caused major difficulties in those early months at Khao-I-Dang. Routine drugs and supplies were often unavailable, available drugs were often labeled in languages and units of measure which were unfamiliar to medical personnel, and supply varied considerably between wards. Standardization of drugs and supplies is essential. It would eliminate situations where we were given large quantities of miconazole (an antifungal agent used only at tertiary care centers in this country) or intravenous verapamil (a drug used for several cardiac diseases, none of which we could diagnose) and yet, occasionally run out of ampicillin or potassium.

Appropriate immunizations to prevent disease should have a high priority as exemplified by the high morbidity and mortality during the measles epidemic. Nutritional support, shelter, and acute medical care are initial priorities, but in situations where widespread malnutrition predisposes to epidemics, immunization is critical. Data need to be generated regarding what groups to immunize and the efficacy of immunizing a severely malnourished population. Other public health measures such as sanitation are outside the scope of this report but must also be a major priority.

A certain amount of initial chaos is almost inevitable in establishing such a massive undertaking for so many extremely ill people so far from established lines of supply. The situation certainly was better at the end of this period than at the beginning; however, that was due in part to the fact that the population had stabilized and, in fact, was beginning to decrease. However, such important items as the laboratory only became a meaningful reality when one of the authors returned to the United States and personally raised the necessary monies to create a laboratory able to do electrolytes, cultures, stains, etc.

And yet, this was not the first such disaster. Much was learned on the job that should have been known from the outset. Each time such a situation arises, the period of initial chaos should become shorter and shorter. We are in close contact with groups in Somalia at the present time, and many of the above suggestions have not been implemented. Existing information needs to be brought together, as well as made available to all involved persons and agencies prior to and during the actual relief effort. Furthermore, the medical community needs to exhibit a greater level of commitment to upgrade disaster relief care.[13] Cornell University Medical School subsequently became involved in operating an emergency ward. This kind of expertise, applied earlier when conditions were more desperate and disorganized and patients more acute, would be of immense benefit and clearly translate into the saving of lives that may have been lost initially due to the inexperience and inadequacy of organization. Our entire experience argues for professionalism, strong leadership, and the recruitment of scholars and experts to organize and implement such major and important undertakings.

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Cuban Refugee Health Care: Response of the American Health Care System to the Unexpected Arrival of 125,000 Immigrants

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Abstract: During the spring of 1980, over 120,000 Cuban refugees emigrated to the United States. Their rapid, unexpected arrival overwhelmed existing health care facilities in south Florida. Government-operated screening centers capable of handling large patient loads were established. Health screening involved a brief history and physical examination and a search for active tuberculosis and venereal disease. Thousands of refugees were processed rapidly and released to waiting relatives and sponsors. Many others, who for social or psychological reasons could not be released, were transferred to holding centers in various parts of the country. US Public Health Service physicians were faced with difficulties whose basic cause could be traced to the boredom of camp life and stresses due to uncertainty regarding the future. Acting out and compliance problems with medical aftermaths were common. About 3,000 refugees remain in custody today. (*Am J Public Health* 1982; 72:594–596.)

The Cuban Refugees

Increasingly over the past several years, the medical profession has been called upon to provide medical care for large groups of refugees immigrating to this country. The recent influx of Cuban refugees is one such example and dramatically illustrates the types of problems that the situation presents.

In April of 1980, over 7,000 Cubans occupied the grounds of the Peruvian Embassy in Havana and demanded asylum.[1] In an effort to defuse the political turmoil that ensued, the Cuban government opened the port of Mariel on Cuba's north shore to foreign vessels and offered exit visas to any Cubans wishing to leave. Over the next several months, an armada of small boats, nicknamed the "freedom flotilla" ferried over 125,000 Cuban emigrants to the shores of Key West, Florida. Unlike previous Cuban emigrants, who often came from upper class or professional backgrounds, the new arrivals were by and large middleclass working people. Most were city bred, in their 20s or 30s and had been employed as laborers, mechanics, or farm hands. Two-thirds were male and approximately 50 per cent had relatives already residing in the United States.[2]

This massive, unexpected influx of refugees completely overwhelmed the immigration facilities in southern Florida. Initial governmental response was limited by the Refugee Act of 1980 which had gone into effect five months previously. The Act defined a refugee as a person who was unable or unwilling to remain in his homeland because of political, religious, racial, or other persecution.[3] The Cubans did not fit this definition and were technically illegal aliens who were not entitled to government paid health care. In spite of the temporary confusion, however, refugees were transported to Miami and provided with food and shelter in National Guard Armories, the aircraft hangars at Eglin Air Force Base, and the inside corridors of the Orange Bowl Stadium.

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