High times at Kunde Hospital, Nepal

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Located in northeastern Nepal, about 20 km from the base of Mt. Everest, Kunde Hospital (see cover photo) was built by Sir Edmund Hillary in 1966 at the request of the Sherpa community. The hospital's mandate is to serve the health needs of a local population of 8000 people living within a 1- to 2-day walk. The village of Kunde (elevation 3850 m) is isolated — a hard 6-day (125 km) walk to the nearest road or a tough 10-hour walk (20 km) to a hillside airstrip. Despite and because of this isolation, Kunde Hospital is a remarkably well-supplied and self-sufficient health facility. Providing quality care over the last 36 years, it is well respected by the local Sherpa community and has evolved to provide outpatient, inpatient, emergency and public health care to this remote region. Soon after its construction, support for the hospital was assumed by the Sir Edmund Hillary Foundation of Canada and a similar organization in New Zealand. These two organizations have been responsible for the financial support of the hospital and for providing it with doctors. Serving 6-month to 2-year terms, New Zealand or Canadian doctors have volunteered at the hospital since 1966. This requirement for external physician support is currently in transition with the recent return of Dr. Kami Sherpa to the hospital. A hospital health worker for 14 years, he completed medical school in Fiji and has returned to Kunde as the "Chief Medical Officer." His return begins a new phase for the hospital, lessening the long-standing reliance on foreign volunteer physicians.

Working closely alongside a dedicated local staff of 3 health workers, the doctors see 20 to 50 patients a day, do 1 to 2 deliveries a week, care for several in-patients, oversee vaccination and antenatal care programs and cover 24-hour emergency care. I write this during the final weeks of a 6-month stint that my wife Katie (a family physician) and I have spent as the "Kunde Hospital Medical Officers." We are very fortunate to have had this fantastic personal and challenging medical experience. It has also made us much more appreciative of the medical system back home in Canada.

Working at Kunde Hospital is something that Katie and I had wanted to do since seeing Sir Edmund Hillary speak in Vancouver in 1996. The half-year commitment was time-sensitive, and my EM program graciously facilitated a leave of absence that allowed me to go. Arriving in mid-December, it was cold on the rugged 2-day walk to the hospital from the hillside airstrip of Lukla. With the Maoists rebels still active, it was also a thoughtful trek along the forested rocky path by the Dudh Kosi River, where huge mountains loomed out of the clouds and winter sun cast a pale light on the deep valley floor. The natural landscape amplified our apprehension and excitement for the coming months.

Our first clinic morning coincided with the first major snowfall of the season. With the village yaks tinkling along even more lugubriously than usual, we saw 10 to 15 respiratory and gastrointestinal problems before being interrupted by stretcher-bearers from a village 3 hours' walk away. The patient had a retained placenta after the birth of her sixth child about 8 hours earlier. Manually removing her placenta, we were extremely cognizant that outside obstetrical help, for possible placenta accreta, would be impossible. Thankfully, all went well. Soon after, a father carrying his 4-year-old son in a basket arrived after a 6-hour walk from their home. The boy, Mingma, had an obviously

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displaced mid-shaft femur fracture. Reducing his fracture, we were then faced with the task of figuring out how to care for him over the coming weeks. It took several hours, but we ended up with an inelegant, but sturdy traction apparatus made from old 2×4s, plumbing pipe, climbing rope and several appropriately weighted rocks. By 5 p.m. we were just catching up on the backlog of patients (all of whom were waiting outside in freezing weather), when a second father arrived, having carried his 5-year-old son, Passang, for 4 days. Septic, with a massive spleen, we weren't certain if he had acute leukemia, kala azar (visceral leishmaniasis) or tuberculosis. Passang stayed with us for over a month and initially improved with treatment for TB. Becoming friends with Mingma, our acute ward became a bustling pediatric unit. By the time Mingma was able to walk home, however, Passang had died. From this first week, we soon realized that accepting our limitations from a geographic, clinical and practical standpoint would be a constant challenge over the coming months.

Though many of these challenges are a result of the isolation and burden of illness inherent to this mountainous region, many challenges also stem from a lack of the support we are accustomed to in Canada. For instance, there is no emergency medical service (EMS) in the Khumbu region. Patients are half dragged or carried to the hospital by family and friends along rough and steep mountain trails, using makeshift stretchers or wicker baskets. Some are very sick when they arrive: floppy babies with meningitis, comatose soldiers with high altitude cerebral edema (HACE), Sherpa elders with advanced pulmonary TB, ghostly pale young women with postpartum hemorrhage, old women with open fractures, dirty babies in septic shock, unfortunate porters with spinal injuries, subdued children with measles, and frightened trekkers and climbers with high altitude pulmonary edema. Often, we longed for the patient to arrive via EMS — current vitals barked out, past medical history of medications and allergies reported, IV in place and resuscitation already begun. Alas not! On several occasions *we* were the EMS. Once, we were summoned to see a porter who had been found at an elevation of 5000 m, unresponsive, with HACE. He had subsequently suffered a closed head injury after falling from the basket his friend was carrying him down in. While ascending a steep trail at 5 a.m. during the 4-hour approach, I remember thinking how beautiful the quiet rhododendron forest was — coated in frost with the pale dawn illuminating the thick mist in surreal light. I wished that I had brought my camera. Instead, I was lugging several litres of saline, mannitol, a portable stretcher, intubation equipment and even a burr hole kit!

The absence of 24-hour nursing care at Kunde Hospital has also been glaringly obvious. Kunde Hospital is small. The three of us work alongside 3 locally trained health assistants — for Katie and myself, the ability of these assistants to speak Nepali, Sherpa, Tibetan and English is essential to our clinical work. Their practical experience with hospital procedures, understanding of the local burden of disease and knowledge of the personal lives of many of the patients is also invaluable. However, despite their dedicated work and very creative problem-solving abilities, they are not there 24 hours a day. This meant that we conducted much of the nursing care, especially at night. Not only does my down coat (worn continuously for several winter months in the freezing clinic) bear a kaleidoscope splash-work pattern of inelegant drug mixing, but obtaining vascular access in flat infants and thawing the port of a frozen IV after a restless night of q3h vitals were just a few of many times I have been very thankful for the nursing teamwork of home.

Specialty support is also lacking. This void of cardiology, pediatric, obstetric or surgical opinion was further

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Fig. 1. 8-year-old Kunde boy with ruptured appendix, being carried 12 hours and 25 km in this chair to local airstrip for evacuation to Kathmandu.

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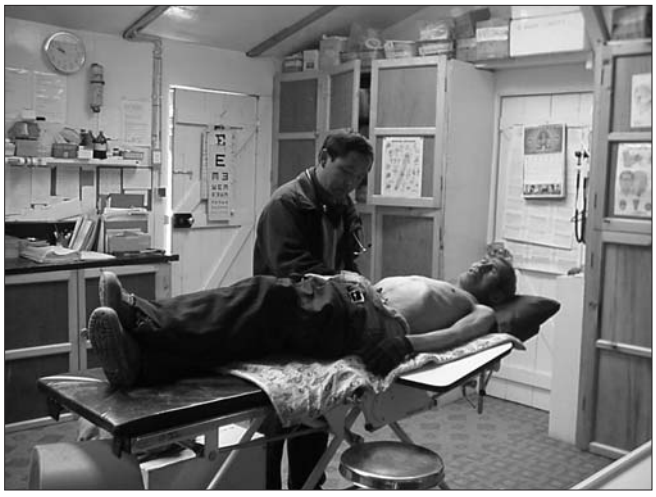
deepened when the Maoist rebels blew up the telephone system serving the hospital 1 year ago. In this consultant vacuum, instead of asking general surgery to assess a stoic 8-year-old boy with a ruptured appendix, we carried him down the rugged 20 km steep trail to the airstrip in Lukla. Strapped to a plastic chair, with a wobbly bamboo IV pole lashed to the side, we plied him with morphine, phenylephrine and antibiotics through the 36-hour walk, wait and flight to Kathmandu (Fig. 1). At one point, with the weather deteriorating, we were nauseatingly close to attempting the operation ourselves. Thankfully he was flown out and operated on the next day. Now fully recovered, he is back in Khunde and is a frequent fleeting and playful companion on our evening walks.

The majority of patient visits take place in the main clinic — a room about the size of an emergency department trauma bay (Fig. 2). There is a single adjustable surgical table and several stools where patients are seen and assessed. Radiographs are taken in one corner and lab work is done on a small bench in another corner. Reference books from the last four decades and hundreds of charts line the wall between "the lab" and "diagnostic imaging." Apart from a light box and a sink, the remainder of the clinic wall space is comprised of floor-to-ceiling cupboards packed with everything from antibiotics to inotropes, IV solutions to casting material, surgical trays (the sterilizing is done in a large pressure cooker in the communal kitchen) to prescription eyeglasses. There is a second bed in an adjoining smaller room, fondly referred to as the "ICU," where we keep sicker patients. In this room we have another oxygen concentrator, a slit lamp, an ultrasound with only German instructions and an ancient ECG machine. A narrow hallway past a walk-in closet, overflowing with cardboard boxes of medications and other supplies, leads to the acute care ward/room where there are 4 patient beds. There is an adjacent building with a patient kitchen and another room with 8 patient beds. An outdoor pit toilet and a large rain-collecting barrel serve as the patient washroom. Power comes from a reliable small hydro-electric plant in an adjacent valley. Solar panels and a diesel generator provide back-up power. We live in a small flat joined to the main hospital and share a communal kitchen/office with the rest of the staff.

At times, Kunde Hospital's laboratory ability is somewhat akin to "flying by night." A few months ago we saw a normally healthy 2-year-old who was having generalized seizures after several days of vomiting. Metabolic abnormalities were the major suspect, but since we have no way to measure electrolytes and the glucometer batteries weren't working in the cold, we couldn't determine if his seizure etiology was from hyponatremia, hypernatremia or hypoglycemia! It was maddening. As seizures continued, airway support became necessary. Family wailed and we desperately tried to correct everything we could think of. Despite these laboratory limitations, some creative approaches have helped broaden Kunde Hospital's laboratory diagnostic abilities. Urine dip sticks work well to test for the relative glucose, leukocyte and protein concentration of CSF in the frequently seen cases of meningitis. Running up and down the hospital hill with a porter load before an ECG serves as the regulated "exercise stress test" and patients in severe shock are transfused whole blood drawn from cross-matched relatives and friends. Despite such innovative laboratory work however, there have been moments where I wished I had a lab like home — a blood gas for a hypoxic porter, cultures in a septic newborn, or could just have the packed red blood cells arrive via runner rather than frantically transfusing whole blood from family members.

There have been New Zealander or Canadian doctors working at Kunde Hospital for almost 36 years. As such, once identified as the current "Kunde Docs," it has been difficult to go anywhere without succumbing to the generous Sherpa hospitality. During medical evacuations, community health visits, or simply on a walk on our one day off a week, we are often herded into people's homes, plunked down in front of the low-slung cooking hearth and made to drink tea, eat some boiled potatoes and maybe down several glasses of the homebrew rice beer, known as "chang." In the smokey kitchen we communicate by a combination of mime and rudimentary Sherpa, interspersed with much laughter. On the dirt floor, snotty-nosed and rosy-cheeked children run about while, closer to the fire, wizened Sherpa elders (with their few remaining teeth) sit spinning prayer wheels and quietly reciting Bud-



Heather Culbert

Fig. 2. Dr. Kami Sherpa in the main room of the hospital.

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dhist mantra. Being privy and welcomed into such elements of Sherpa culture has been one of the real gifts of being here.

Being a "Kunde Doc" necessitates a broad range of extra clinical duties that have thus far included teaching first aid courses to the Nepal Mountaineering Association, planting a greenhouse, assessing sick yaks, fitting patients with corrective lenses, pulling infected teeth, drug ordering, cooking for patients, sterilizing instruments, euthanasia on a terminally ill dog and building an incinerator to dispose of medical waste. One particularly difficult extra-medical duty involved arranging for the safe passage of a Tibetan refugee family to Dharmsala. Along with 20 others (including children as young as 6), they had left Lhasa and walked for 21 days, ultimately crossing the Nangpa La pass (elevation 5700 m) into Nepal. They undertook this passage with the clothes on their backs and had minimal food, no blankets and no shelter. Other than memories of their invaded homeland, cheap sneakers were the only mark of the imperial regime they were fleeing. Carried to the hospital from the Nepal side of the pass, the feet and toes of this family were an ugly purple-black. With wild hair, sunburned faces, and vivid turquoise jewelry, they were a tired but proud bunch and made the caravan of sponsored and brightly clad expeditions heading to line up on Everest seem ridiculous. Because of serious frostbite (Fig. 3), they were unable to continue their walk to Dharmsala and stayed at the hospital for almost a month. With the police trying to send them back to Tibet and no one willing to risk carrying them out, we ultimately had to arrange for a United Nations High Commissioner for Refugees representative to accompany the refugees on the remainder of their journey.

In the spring, we conducted a door-to-door demographic and health census survey of the Sherpa population living in the 1100 homes scattered across the region. Designed to determine regional maternal, infant and child mortality rates, the survey findings will help strengthen Kunde Hospital's antenatal care, family planning, and vaccination programs. The monthly vaccination/immunization day is a particularly memorable clinic. Every month, 50 or more tough and beautiful Sherpa moms walk up to 6 hours with their newborns to have them examined and get their first vaccinations and immunizations. The area outside the clinic becomes a colourful cacophony of laughter as new moms share their stories and visit, toddlers toddle and babies cry. Inside, we struggle to keep track of who belongs to whom as one cute baby after another passes through. The air fills with the sweet and sour smell of babies, breastmilk and the inevitable dirty diaper (or in this case dirty baby as most don't have diapers). We trip over each other carrying babies to the scale, struggling to make our rudimentary Sherpa understood over the caterwaul of babies.

Katie Morgenstern

Fig. 3. Author performing debridement of frostbitten feet. Patient is a Tibetan refugee.

Despite such efforts, infant and maternal mortality rates are still very high. However, more women are deciding to have their first baby at the hospital. The women walk several hours along mountain paths, usually in labour, before delivering their babes in the main clinic. The mother is soon force-fed sweet-butter tea or chang and then sits back, baby on breast, to receive her many well-wishers. Meanwhile, we clean the floor and equipment and prepare the clinic for the awaiting outpatients. It is the husband's job to bury the placenta behind the hospital, where flourishing rhododendron and juniper bushes are testament to the increasing number of deliveries at the hospital. The next day, proud parents drape us in ceremonial white scarves and present us with beer and Coke that has been blessed with lumps of butter before walking home with baby basket and belongings carried on a tumpline.

Not all deliveries have been so blessedly simple. Fetal distress has resulted in several challenging mid-vacuum deliveries. A case of maternal distress resulted in the most stressful moment of our medical careers when we had to perform a cesarean delivery. With no anesthesiologist, no surgeon, no OR nursing staff, and no pediatric resuscitation team, the isolation and commitment loomed large. Four a.m. after a sleepless night, the frightened husband burned juniper about the bed while we draped the mother. With ketamine and diazepam infused, we made the first concentrated cut. Anatomy lessons reverberated in my head as we dissected down to uterus. Cutting the "smile incision" softly, fanatically aware of the pulsing uterine arteries, to reveal the pearly-gray trunk of the baby. She was well wedged in the pelvis and only after a bloody wrestle did the flat babe come out. Barking out resuscitation orders, we closed nervously. Once the uterine incision was

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sutured and dry, the baby finally made her first wail. Dawn sunlight over the shoulder of Mt. Ama Dablam bathed the clinic as we stapled the skin. By 6 a.m. it was all over. Sitting in the cool morning air, tingling with adrenaline, Katie and I shook our heads at each other: slightly stunned at what we had just done and by the fact that mother and daughter were both alive and well. All has continued to go well, and we were even presented with an entire case of butter-blessed Coke by the proud father!

In addition to the Canadian and New Zealand support, the hospital depends on donations for the majority of its operating costs. As such, during the trekking season, we are often required to give a tour several times a day to groups of trekkers from all over the world. The tourists are almost always surprised by the extent of morbidity caused by infectious disease, especially from tuberculosis. Considering the facts, they have good reason to be concerned: one-third of the world's population, more than 2 billion people, has latent TB. Over 9 million new cases of active TB develop each year and result in close to 3 million deaths per annum. On average, an active case will infect 20 other people before it is identified and treated.

Robert Stevens

Fig. 4. View of village of Kunde from Namche Pass. Prayer flags in the foreground.

Fifty million people worldwide now have multi-drug resistant TB, and there hasn't been a new class of anti-TB drugs developed since the late 1960s.[1] In Kunde, we diagnose about 1 new case of TB a week and have the relative luxury of being able to provide lengthy courses of combination drug regimes at no charge to the patient. There are far too many places on the planet far less fortunate. Emergency physicians or not, we need to take more responsibility toward balancing such glaring health inequities at home and abroad.

Writing this, the sun has come out and the shining mountains are trailing ribbons of wind-swept snow. With colourful village prayer flags riding the wind, it is a pristine and wild scene (Fig. 4). Shrill horns and cymbals clash from the hillside monastery behind the hospital, blessing the crops that are soon to come. Thick clouds of smoke from offerings of burning juniper drift through the stone village and across fields sprouting fresh green shoots of potato. In the spring light, beautiful indigo azalea shrubs, bold purple irises and delicate rhododendron bushes are highlighted by the monsoon cloud and Lama-blessed juniper smoke. The shifting cloud, sunbeams and monsoon mist do little to curtail my melancholy about our upcoming departure. Despite the occasional frustrations and some medically frightening moments, I have felt a sense of usefulness here that I want to hold on to. In addition to having worked alongside a fantastic group of people, I have had the privilege of being part of many a poignant and profound doctor/patient/human interaction that has forced me to simply appreciate being alive. Sad to go, but excited about what is to come, I leave enriched as a physician and as a person.

Competing interests: None declared.

Reference

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