CASE REPORT

SOCIOECONOMIC CONSIDERATIONS REGARDING A LAND MINE VICTIM WITH MAXILLOFACIAL INJURIES

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Abstract. This article describes a case we experienced while doing volunteer medical work in Cambodia for six months in 2002. By examining treatment of a 14-year-old female land mine victim with maxillofacial injuries, we report on the present socio-medical situation in Cambodia. This case suggests the lack of infrastructure, facilities, human resources, and patient education make it extremely difficult to provide patients with proper treatment, including general anesthesia. A comparison of land mine victim statistics between 2002 and 2005 reveals significant problems.

INTRODUCTION

From 1979, the year of the collapse of the Pol Pot regime, until 2002, victims of land mines in Cambodia have numbered 57,628. Of these, 18,063 died and 39,565 were wounded. In 2002, deaths totaled 145 and injuries totaled 689. Of these, 506 were men, 52 were women and 276 were children, with the total number of victims being 834. The current report of casualties in 2005 showed that 168 people were killed and 707 were injured; 525 were men, 83 were women and 267 were children; 7 were military personnel and 22 were those who detected the mines. The data shows little change in the number of mine accidents: 834 in 2002 and 875 in 2005. The number of victims has remained fairly constant from 2002 to 2005, an average rate of 842 per year (Anonymous, 2006).

This case report was unique because it is limited to documentation concerning one patient a land mine victim, and the socio-medical situation in Cambodia.

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CASE REPORT

The patient, a 14-year-old female weighing 35 kg, was walking in an area along the border between Thailand and Cambodia when she stepped on a land mine, which exploded. Thirty-four hours after initial treatment at a local hospital, because of anemia, she was transferred 300 km (about 190 miles) to the Angkor Hospital for Children in Siem Reap, Cambodia. At that time her Glasgow Coma Scale reading was 3-3-4 (Teasdale and Jennett, 1974): her eye response was 3 (eye opening to verbal command), her verbal response was 3 (inappropriate words), and motor response was 4 (withdrawal from pain).

Fig 1–Patient with a fracture of the left mandible and a maxillofacial skin defect. The left maxillofacial skin defect reached from the epidermis to the muscular level. Right open fractures of the tibia and fibula with bruises and burns.

Upon admission she needed a transfusion because of her anemia. Her vital signs were pulse 160/minute, BP:108/36 mmHg, temperature : 37.0ºC, and oxygen saturation: 100% with oxygen at 3 liter/minute by mask. Laboratory data were hemoglobin: 2.9g/dl, hemotocrit: 9.0%, RBC: $110x10^4$/µl; platelets: $19.4x10^4$/µl; and WBC: 17,000/µl. She had a fracture of the left mandible with a maxillofacial skin defect. This defect extended from the epidermis to the muscular level (Fig 1). There were also open fractures of the right tibia and fibula with bruises and burns (Fig 1). Bruises and burns on the left leg were apparent, and second to third degree burns were estimated to cover about 20% of her body. Transfusions of packed red blood cells (total 900 ml) were performed three times in two days. On the first day, 600 ml was rapidly transfused, and on the second day 300 ml was given over about 2 hours. The blood was donated by medical staff and tourists. Tetanus toxoid was given intramuscularly, and the antibiotics were administered intravenously (penicillin G 15 mg/6 hours, ampicillin 500 mg/6 hours, and gentamicin 60 mg/8 hours). Her vital signs stabilized, and laboratory data showed: hemoglobin: 8.1 g/dl, RBC: $296x10^4$/µl, hematocrit: 23%, platelets: $16.0x10^4$/µl, WBC: 17,600/µl and urine output was 2,960 ml/24 hours. Making sure her Hb level was acceptable, under general anesthesia we debrided the left maxillofacial area and the right leg. We used rapid sequence induction with thiopental 175 mg (Ravonal 5 mg/kg) and suxamethonium 40 mg. For management, we used 1% halothane and 3 liter/minute air using a vaporizer. Intubation was not easy, and it was difficult to decide how to introduce and manage general anesthesia because of body and facial conditions. We suspected that the main problem during induction of general anesthesia would involve face mask ventilation because of facial injuries. Intubation of the patient was also difficult because she withdrew from pain, and we were concerned about a cervical injury. The patient was assumed to have hyperkalemia due to her burns, and we decided on general anesthesia following an algorithm (Fig 2). The safest option was for her to have a tracheotomy under local anesthesia. However, we lacked the skills and equipment, as well as a laryngeal mask and bronchofibroscope. We could not perform face mask ventilation since we could of not gain the patient's cooperation, and consequently rapid sequence induction was implemented. During the operation and recovery, her condition remained stable. Five days later, the right leg

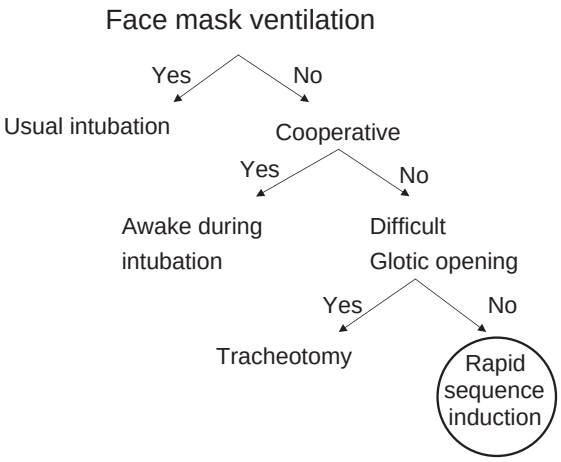

Fig 2–Original algorithm. Face mask ventilation was difficult because of facial injuries. Obtaining cooperation was difficult because of patient movement caused by pain and there was the possibility of cervical injury. Glotic opening was difficult, so, rapid sequence induction was chosen.

developed necrosis and had to be amputated, which was done under general anesthesia. We also performed crash induction using ketamin intravenously and suxamethonium. Her condition remained stable during both the anesthesia and recovery. Thereafter disinfection and dressing of the bruises on the right leg were continued, and the right leg wound gradually closed.

Twenty-three days after the operation, a swelling of the left parotid gland and the formation of a fistula were noted. There was no particular improvement during five days of observation. At day 28, a drainage tube was inserted into the left parotid gland under general anesthesia. With this use of general anesthesia, it was possible to perform face mask ventilation. We implemented normal intubation, using ketamin and vecuronium. Her condition remained stable during the operation and recovery, but the drainage tube placed in the left parotid gland did not work. As a result, the parotid gland started to swell. We could not expect second-stage healing of the left facial defect, so a skin graft from the left thigh was performed. After the operation, the left side of her face healed slightly. At day 38, the graft to the left side of the face had adhered, but a swelling of the left parotid gland remained. Under these conditions, she left the hospital and never returned for additional treatment.

DISCUSSION

As our report indicates, the medical situation for the victims of land mines in Cambodia is still inadequete and does not appear to be changing.

Geographically, access to primary-level health facilities is available to 50% of the population but nearly all land mine fatalities occur before the victims reach the hospital due to poor access. The percentage of paved roads in the country was only 16.7% in 2002 (The World Bank Group, 2002). There are a lack of facilities; the country has only 8 national hospitals with 1,700 beds, and 24 provincial hospitals with 3,400 beds (Anonymous, 2000). The medical staff in Cambodia are also insufficient. The number of physicians per 100,000 people in 2002 was 15.5, that of nurses was 56.9, and that of dentists was 0.9 (National Institute of Statistics, 2003). Because the number of anesthesiologists is especially small, nurses have been trained to handle their duties (Marchard *et al,* 1995; Yanagisawa, 2002). In the case of our patient, one Cambodian surgeon and an intern doctor operated, and an anesthesiologist from Belgium organized two Cambodian nurses and one intern doctor. We assisted both the surgeon and the anesthesiologist as an oral surgeon.

Medical service is also restricted due to a lack of medical instruments, doctors' skills and knowledge. There are problems with diagnosis and treatment, since doctors must face the question of how to provide patients

with necessary treatment using the limited resources available. In the case of an emergency, there are many cases where doctors performed traumatonesis without confirming the existence of a parotid duct lesion. Consequently, a parotid fistula occasionally occurrs (Hori *et al,* 1993). Even though the parotid fistula happened, we were able to confirm the incision into the parotid duct to insert a tube into the wound by observing the outflow of saliva. If we had had adequate medical instruments available, we might have been able to transit the oral cavity to find the stenon duct (Watanabe *et al,* 1999). The methods of diagnosis and treatment that clinics in developing countries can choose are limited by a lack of financial resources. Therefore we must do our best with what we have.

As for general anesthesia, the methods used depended on the facilities of the hospital and the techniques known by the performing anesthesiologist. In this case, we lacked the best choices for the patient. For instance, the doctors' skills were insufficient. They lacked the ability to do a tracheotomy. There was insufficient equipment, such as laryngeal masks and a fiberscope. Referring to the ASA algorithm (Caplan *et al,* 2003), we made an original algorithm (Fig 2). Despite the limitations, we managed to induce a minimum level of general anesthesia because our co-workers carefully discussed and confirmed clearly what to do at each stage of the treatment.

The patient had swelling and a fistula of the left parotid gland, but she was discharged and never returned. The reason for her discharge was a lack of hospital beds. Many dengue fever patients were hospitalized at that time. Her treatment was changed to outpatient, but she never returned to the hospital. We believe there are two reasons for this: one is poor access to the hospital, and the other is lack of knowledge about health care. With regard to education, the literacy rate for women was reported to be as low as 64.1% in 2004 (UNICEF, 2004). In 2002, the percentage of children who entered primary school was 86.0%, but the percentage of those who entered junior high school was just 19.7% (Ministry of Education, Youth and Sport, 2001-2005). As we treated the patient, we needed to keep her poor educational background in mind. We needed to give extra health education for her and her parents.

In conclusion, the patient injured not only her tibias but also her maxillofacial area with second and third degree burns. Eventually, she may recover from those injuries, except for the left parotid fistula and swelling. Based on this case, four significant criteria are needed to treat a patient in Cambodia. First, the construction of an infrastructure and a transportation system is necessary. Second, facilities, such as hospitals, beds, and medical equipment, are needed. Third, human resources, such as medical doctors, dentists, and nurses must be increased and trained with advanced skills. Fourth, the patients need to be educated regarding basic health information. Achieving these goals in Cambodia is not easy, and we suggest that training and education programs be provided to improve health and health care instead of spending great amounts of money on the infrastructure. To be sure, special treatment for land mine victims by oral surgeons should be provided as much as possible in the limited situation. Finally, land mine injuries are still occurring regularly in Cambodia.

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