



## Surgery in Afghanistan: A Light Model For Field Surgery During War

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Owing to a poor capability for evacuation, mobile medical teams were sent to the area of Gazni in Afghanistan to work with local paramedics as part of a medical programme for the area. The teams were equipped to perform major surgery. During one month a surgical team inside Afghanistan performed 53 operations. The operations were performed in the patients' homes at night. The team had to move frequently so as not to be spotted by the Soviet and government surveillance. Equipment equivalent to a light field hospital was stored in a safe place and the team carried supplies for one or two days on their bicycles. One postoperative death and one wound infection were recorded.

It is concluded that adequate surgery can be performed inside territories where enemy forces have air control and under primitive conditions with an acceptable rate of complications. However, due to the nature of the guerrilla warfare with scattered military confrontations over vast areas, the average time between injury and treatment for war casualties was 36 hours.

### INTRODUCTION

The number of qualified doctors was already insufficient before the Soviet invasion of Afghanistan (Dupree, 1980). An increasing number of refugees had been noted during the past 10 years. In Pakistan, 3.5 million refugees were registered; the number in Iran was about 2.4 million (U.S. Committee for Refugees, 1988). The number of displaced persons inside Afghanistan was not known. The population of Afghanistan before the invasion was estimated to be about 15 million (Dupree, 1980). The primitive conditions, together with the military situation with no fixed front line made organization of medical and surgical care difficult (Halbert et al., 1988a, Halbert et al., 1988b).

In order to provide primary healthcare and surgical services to a community in the Gazni province, the Norwegian Afghanistan Committee (a volunteer organization) in 1985 started a medical programme in cooperation with the largest guerrilla movement in the area. The programme included the training of local paramedics and sending of international medical teams to the area. The teams operated inside Afghanistan for periods of three months and had to travel through areas controlled by Soviet and government forces. Three teams a year have covered the months between March and December since 1985. It was difficult to refer patients to Afghan or Pakistani hospitals for long periods. The teams were therefore equipped to perform major operations. For one

three-month period every year a surgical team with a qualified specialist in general surgery, an anesthetist, and a scrub nurse were sent to the area. Otherwise the teams were manned for general practice. The teams were financed mainly by Norwegian government funds. Most team members had experience from work in other parts of the world, either in development projects or as members of rescue teams. We present here the experience of one surgical team during a one month period in Afghanistan in 1986.

### METHODS

The team consisted of a general surgeon, a scrub nurse who was also a qualified midwife and a nurse anesthetist. A period of six weeks were spent on entrance and exit from the area due to temporary fighting at the border. No elective operations were performed during the last 10 days before departure to allow some observation time, thus the actual operating time in the area was approximately 30 days.

Owing to daily surveillance and infiltration by the Soviet and government forces, the team had to be mobile. The team members were disguised as Afghans and moved from one village to another on bicycles every eight hours with their guards. All equipment was carried on six bicycles.

Surgical equipment equivalent to that of a light field hospital was stored in a village central to the area of operation (Fosse et al., 1988). The equipment carried on bicycles was supplemented from the central storeroom every second day. No operating table was included, but the team carried a light stretcher on the bicycles (Apothekernes fellesinnkjop, Oslo, Norway) and this was used as an operating table. A small portable X-ray machine (Flying Eagle, Shanghai, China) and a 2.5kW generator (Honda, Tokyo, Japan) were transported in a specially designed box on a donkey, together with films and development fluids. Examination by X-ray had to be planned in advance and could seldom be used as an acute diagnostic tool.

Equipment was sterilized by boiling in a kettle for 20 min. A small grate was made with metal pins in the bottom of the kettle to keep the packages from getting wet. During daytime the team split up. The nurses prepared equipment for operations while the doctor treated outpatients. In the afternoon the team moved to the village where surgery was to take place. One to four operations could be performed every night five days a week. All surgery was carried out in the home of one of the villagers.

One condition for accepting a room as an operating theatre was that it had a wooden paneled roof. Most homes had dried leaves as inner insulation of the roof,

Missile injuries	11
Other injuries	12
Elective orthopaedic	4
Gastroenterological disease	3
Hernias	10
Anal fistula	1
Gynaecological disease	3
Infections	7
Skin tumors	3
Total	53

thereby dirt and insects could drop into the operating field. Sterile gloves, but no operation gowns were used during surgery. A simple head lamp bought in a sports shop was used to illuminate the operating field. One or two local paramedics were included in the operating team in a systematic fashion as part of their training programme. The paramedics were mainly responsible for the postoperative treatment and the immediate contact with the patient and his family.

All missile wounds were treated openly (Owen-Smith, 1981). Fractures were treated by cast or external fixation (Livingston, 1985). Wide wound excision and

open treatment with adequate drainage were performed in all cases.

Antibiotics were administered to 10 patients, of whom three had missile injuries and two had osteomyelitis.

As the team could only observe the patients for a few hours after operation, regional or local anesthesia was preferred in adults, while ketamine chloride was used in children. The team possessed five per cent dextrose and dextrose/saline solution for intravenous infusion. No other electrolytes were included. There were no means for blood transfusion.

All visits and operations were registered. A total of 35 patients were examined by the team postoperatively; six patients were followed up by later teams only. Thus, follow-up was possible in 86% of the patients, in some cases for up to four years. All complications were recorded.

## RESULTS

During one month the team performed 53 operations in 46 patients, 28 males and 18 females, and treated 400 outpatients. A total of 28 patients were examined by X-ray, of which six underwent operation following examination. Median age at surgery was 22 years (range 0.5 to 65 years) at the time of operation. The categories of operations are listed in *Table I* and the surgical procedures in *Table II*. Of the operations, 22 (41.5%) were performed in children under 15 years of age.

Of the 53 operations, 11 were operations for missile or shrapnel wounds, nine primary and two secondary. In addition, one patient with a war-related injury was operated on three times. He was pushing a truck on the road when it hit a mine. The truck was thrown backwards and landed on his foot, the subsequent multiple fractures and avulsion lesions of his foot led to amputation of the first toe and two wound excisions before split-skin grafting could be performed. He recovered fully.

The time from injury to operation was a median 36h, but varied from less than one hour to six days.

Apart from the war injuries, 10 patients underwent operations for hernias and three gynaecological cases were treated. In one case bilateral oophorectomy had to be performed in a young woman because of large ovarian tumors. Two women with menorrhagia were treated with curettage.

One left-sided hemicolectomy was performed for volvulus of the colon and four days history of ileus. Local or regional anesthesia was used in 40% and ketamine chloride in 34% of the operations. Of the three laparotomies performed by the team, one was performed

under a combination of ketamine chloride and spinal anesthesia, another was performed with fentanyl/pancuronium anesthesia, while the third was performed under spinal anesthesia after pre-medication with morphine (Table III).

One patient died suddenly 11 days after ileus and left hemicolectomy. Pulmonary embolization or acute cardiac infarction was suspected.

One wound infection in a small child was recorded after a Z-plasty of the knee. The wound was contaminated by feces that had leaked under the postoperative plaster cast and was infected by bacteria as well as pinworms. After daily washing in soap solution and systemic treatment with mebendazole tablets, split-skin grafting was performed two weeks after the primary operation.

One patient developed septicemia after a crush injury of the right foot. He developed septic shock shortly after arrival in the operating room but recovered after wound excision and treatment with penicillin and gentamycin.

A boy with a large inguinal hernia developed a scrotal hematoma due to postoperative bleeding.

Two complications after anesthesia were observed; one man needed large doses of morphine for an infected missile wound in the left arm with an open fracture of the radius and was in need of assisted ventilation for 0.5h before he breathed spontaneously. A four-year-old girl developed bronchospasm after administration of suxamethonium chloride, but was intubated successfully (Table IV).

Procedure	No.
Wound excision	11
Removal of shrapnel	2
Skin grafting	7
Finger/toe amputation	6
Curettage	2
Laparotomy	3
Hernioplasty	10
Incision drainage	7
External fixation	1
Other orthopaedics	5
Plaster cast	2
Excision of the skin tumor	3
Total	59

Type of anaesthesia	No.	Age, median (range)
Local (Xylocaine 1%)	13	29 (0.5-65) years
Regional (Xylocaine 1%)	7	10 (5-45) years
Spinal (Marcain 2%)	12	37 (20-45) years
Ketamine chloride	17	8 (0.7-45) years
Spinal/ketamine chloride	1	20 years
Fentanyl/pancuronium	1	50 years
None	2	13 (1-25) years
Total	53	20 (0.5-65) years

Age	Operation	Complication
3	Z-plasty right knee	Infection under cast, feces in wound
50	Hemicolectomy	Sudden death, pulmonary embolus?
45	External fixation	Respiratory failure, morphine intoxication
18	Bassini plasty	Scrotal hematoma
37	Toe amputation, revision	Septic shock during operation
4	Reduction of dislocated hip	Bronchospasm

## DISCUSSION

In conventional warfare the evacuation chain is based on a stepwise evacuation. In Afghanistan where the occupation force had complete air control and the war was fought by different guerrilla groups, the conventional evacuation chain gave an unsatisfactory long evacuation time (Bhatanagar and Smith, 1989). Thus, different types of mobile medical units were organized inside the occupied territories because the government forces lacked ground control (Halbert et al., 1988b).

The team was operating in a relatively small area, so as not to be cut off from the main guerrilla forces in the area. The casualties coming from more remote areas had to be transported at night through areas under enemy control explaining the varying time which elapsed from injury to treatment.

We have previously experienced the advantages of advanced surgery as close as possible to the fighting zone in conventional warfare (Fosse et al., 1988). Surgery is advised as soon after injury as possible (Jones et al., 1968; Jackson et al., 1983). The present organization was arranged in order to bring advanced surgery as close as possible to the front line.

The fact that the enemy had complete air control and even the ground control in some parts during daytime, made the mobile guerrilla model necessary. The evacuation time was significantly shorter than has been reported from the Red Cross hospital in Quetta, Pakistan (Rautio and Paavolainen, 1988; Coupland and Howell, 1989). However, no thoracic injuries or bowel injuries reached the team, indicating that the evacuation time in many cases may have been too long. The closest permanent free hospital was the Red Cross hospital in Quetta. The nearest Red Cross first-aid clinic was situated in the village of Wana at the Afghan-Pakistani border. During peacetime this clinic can be reached within one day. However, due to the military situation, the transportation could be dangerous and take much longer. The first-aid clinic in Wana was not staffed to perform surgery at the level that the surgical team could provide. Another important factor was to supply medical facilities to the civilian population in the area and thereby postponing flight. Thus, many civilian disorders were treated by the team (*Table II*).

Only three operations were performed on the floor, among them a laparotomy. We strongly recommend the use of a stretcher or a table to get the patient up off the floor. Kneeling while performing major operations is tiresome and difficult. The availability of X-ray examination was useful for follow-up in the treatment of fractures and osteomyelitis. It was, however, time-consuming and complicated. The equipment had to be installed in a safe house after transport, fresh chemicals had to be mixed and a dark room was required. Normally the generator had to be installed in the room in which the examination was performed to reduce noise outdoors and avoid being spotted from the air. The 2.5kW generator gives an uneven current when used under rough circumstances, making the estimation of exposure time difficult. However, after some training fairly good quality X-ray films were achieved.

Different sterilization techniques have been tried in the different mobile surgical units operating inside wartime Afghanistan (Simon et al., 1988). The techniques used by the team did not differ significantly from those reported by others.

Although the operations were performed under primitive circumstances, only one wound infection was recorded (*Table IV*). This wound infection was not related to the operation, but was due to contamination of the wound by feces.

One factor for the low incidence of wound infection may be the generally low hygiene in the population. As the operations were performed in the people's homes, we believe that they had developed immunity to most bacteria present in the environment. Antibiotics were given in nine cases because contamination or infection was evident, and only in one case for prophylaxis. Prophylactic antibiotics were not used routinely due to limited stores.

The mobile organization of surgery with most operations performed at night and the constant need to move was exhausting and required psychological and physical fitness by the participants.

On the other hand, by careful planning fairly advanced surgery could be performed under primitive circumstances and the present model could be useful in other areas where one has to organize medical and emergency work under enemy occupation and where the evacuation time to a permanent, safe hospital is unacceptable. However, the mobile teams are expensive, and scattered guerrilla activity will require several teams to give sufficient coverage of war casualty treatment; but even insufficient medical coverage may have an important effect on the fighters' morale and spirit.

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